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Raking Attachment for Harvesters.

The object of the improvement shown in the engraving is to clear the platform of the harvester and lay the grain in winrows convenient for binding into sheaves. The harvester proper, does not differ essentially from others, the principle of action and the mode of construction being similar to the harvester in general use; but the prominent feature of this implement is a device for raking the grain from the platform. This appliance, although working automatically by the motion of the machine, is entirely under the control of the driver, who by means of a brake operated by the foot can instantly stop or start it.

The rake has a bar projecting from the semicircular box on the side opposite the driver's seat at an angle, the bar being furnished with teeth of unequal length to suit the angle. At the inner end, the rake bar turns in a journal attached to a radial frame which is pivoted on a vertical shaft. A bevel gear revolves loosely on the rake shaft, the hub of which turns against a collar secured to the rake shaft. This bevel gear meshes into a beveled toothed segment fixed to the frame, so that when it traverses on the face of the segment it receives a rotary motion. The vertical shaft has also a bevel quadrant gear engaging with a quadrant gear secured to a horizontal shaft actuated by a crank on the shaft of the main driving wheel. On the rake shaft is a collar-clutch which works by friction.

The operation of the rake is as follows: As the harvester moves over the field the crank on the driving shaft gives motion to the quadrant gear on the horizontal shaft, which gives motion to the rake arm, swinging it around from the point furthest from the driver's seat to the opening nearest his position. While performing this quarter revolution the teeth of the rake fit closely to the platform. After this partial revolution is effected the rake starts back again, performing half a revolution horizontally, the teeth coming into position at the end of its traverse, ready to take the gathered grain and sweep it off the back of the harvester. Although the action of this semi-revolving and sweeping rake is produced by the driving machinery, it is controlled, as before mentioned, by a brake operated by the driver's foot, so that he can rake off and deposit the load according to his judgment.

McGAUGHEY'S RAKING ATTACHMENT FOR HARVESTERS.

This improvement in harvesters was patented Feb. 9, 1864, through the Scientific American Patent Agency. Address for facts relating to the sale of rights, etc., Harrison & McGaughey, Saint Anthony, Minn.

Improved Car Truck.

The breaking of a car axle is always a misfortune, and not unfrequently is the cause of a catastrophe which is fatal to life and greatly injurious to property. The intention of the improvement herewith represented is to diminish the danger to such accidents and to give increased facilities for turning curves. It is intended also for supporting the trucks and retaining them in position if an axle should break, and for guiding the trucks if a flange of a wheel should break.

Fig. 1.

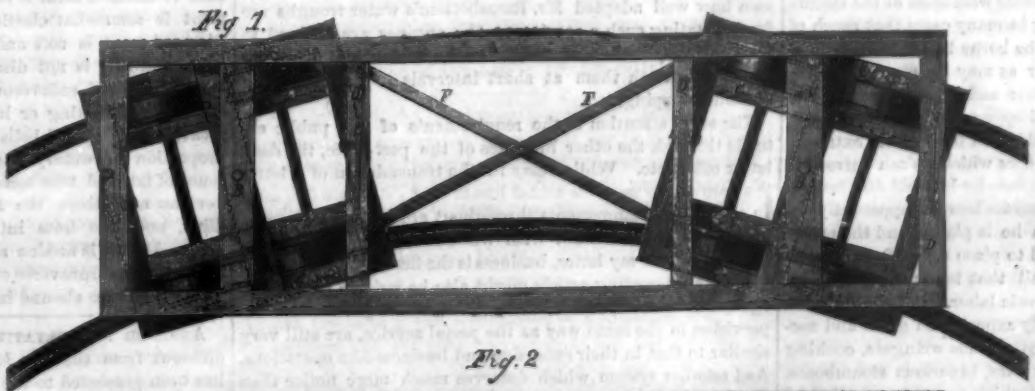
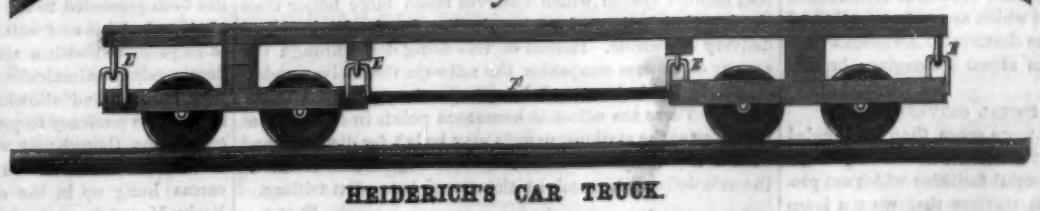


Fig. 2.



HEIDERICH'S CAR TRUCK.

Let A be the bottom frame of a car to which the trucks are pivoted at B. The axles of the wheels each have four bearings or boxes, two on the outside and two on the inside of the wheels. They are shown by the dotted lines on the bars, C, in Fig. 1. It will be seen that each wheel is supported in such a manner that if the axle should break in the central portion or on the outside of the wheel, the wheel will be kept in position and therefore cannot run off the track. To the under side of the car frame are secured four pendant long loops, in which are linked smaller loops attached to the frame of the truck at front and rear. They are seen by the dotted lines on D, Fig. 1, and at E, Fig. 2. These loops serve as supports for the truck in case of accident, enabling the trucks to keep the track and also preventing serious consequences. The bars, F, are pivoted at their ends to the trucks, crossing each other diagonally. They unite the two trucks so that one may be a guide for the other in rounding a curve if the flange of a wheel should break, while they do not interfere with the free and independent action of the trucks when running under ordinary circumstances. Thus the co-operation of the two trucks is assured. Those interested in railroad matters can obtain any additional information desired by addressing the patentee, B. Heiderich, Brady's Bend, Pa.

The improvement was patented through the Scientific American Patent Agency on the 13th day of November, 1866.

The Aniline Dyes.

A new red has been obtained by Coupier by a combination of two of the hydro-carbide bases of coal tar, which he has decided to be incapable of yielding a color in their separate condition. It is named *toluen red*, and is pronounced the richest red yet known. The so-called aniline dyes are among the most beautiful results of chemistry. The series already includes and rivals the colors of the rainbow, and Coupier's analyses promise indefinite varieties of beauty to come. Beginning with the admired varieties of red and purple, such as *mauve*, *magenta*, etc., additions like that above named have followed, including the splendid green called verdine, unchanged by candle light, a blue as clear as opal or the Italian sky, a good yellow, and a fair black. The intensity of these colors is shown in the fact that one grain of magenta in a million of water gives a good red, one in ten millions, a rosepink, one in twenty millions gives a blush to the water, and one in fifty millions a reddish glow.

Aniline is, however, but a modification of one of a variety of hydro-carbides constituting the very variable bases of benzine and coal tar, and of which some combination is supposed by the investigator above referred to, to be necessary to the production of colors. M. Coupier has been engaged in the endeavor to realise industrially the isolation and management of these bases, in order to establish methods for uniform results; with the above instalment of theoretical and practical success. The rectified naphtha is resolved into benzol which makes aniline, toluen which makes toluniden, xylen and hence xyleden, and a number of other distinct hydrocarbides, the possible compounds of which with each other and with oxygen, etc., when fully ascertained, will probably yield a complete and uniform series of dyes before which the old vegetable and mineral dye stuffs will rapidly pass into disuse.

Monkeys in the Cotton Fields.

A cotton planter from Georgia gave his experience, some time ago, in the Galveston (Texas) *News*, on training monkey's for picking cotton. He writes that in 1849 he owned a cotton plantation in Georgia, and that having occasion to visit the Island of Trinidad, he was persuaded to buy twenty-three monkeys, at a round price, to test their latent capacities for cotton picking. The letter adds:—

"I was mighty well pleased when I received my monkeys. Their arrival turned my plantation topsy-turvey. For two weeks nothing was done by whites or blacks but play with the monkeys. The overseer got one of the brightest looking, and remained at his house most of the time watching the monkey's tricks, and I must confess that my wife, myself and children were in the same business. Seeing this would not pay, I began making preparations to go to work. I had reckoned on one negro managing ten moneys, and five monkeys picking as much as three negroes.

For the next two weeks, all hands, whites and blacks were engaged in the cotton fields, teaching monkeys. The result was somewhat different from my calculations. Instead of one negro managing ten monkeys, etc., it took ten negroes to manage one monkey, and then the monkey did not pick a pound or an ounce of cotton. I became disgusted, gave all

my neighbors that would accept a monkey, and about a fortnight since sold the last eight to a traveling menagerie at $5 a piece. My monkey speculation has thrown me behind six weeks in cotton picking. The next time I go to Trinidad I don't believe I shall want any monkeys."

[From our Foreign Correspondent.]

THE BRITISH POSTAL SYSTEM.

MANCHESTER, March 9, 1867.

CONTRASTS OF BRITISH AND AMERICAN GENIUS.

To one whose views are not so narrow as to insist that all that is good in any respect is centered in his own immediate circle of acquaintance, and who is not on the other hand so affected as to despise what is familiar or homely, there can hardly be a pleasanter exercise than in comparing the peculiar genius which characterizes two such nations as England and America. Sprung originally from the same stock, speaking the same language, and addicted in the main to the same pursuits, there is nevertheless a difference in the character of the two peoples so marked as to be apparent to the most unreflecting. This is shown in nothing more clearly than in the varied channels in which the inventive faculty of the two nations has chiefly run, and the direction in which the greatest progress has been made on either side of the water.

BRITISH INVENTION GRASPS AT POWER.

England is *par excellence* the nation of wealth, and this not in any great degree from its titled land proprietors, but from its far more important class of merchant princes. The one idea pervading all her action is the extension of commerce both at home and abroad, and the importance of any thing that may be proposed is judged of according as it tends to promote this object. Let it be shown that a greater facility of communication for mercantile purposes may be obtained by a given innovation, and they will assuredly take the lead of all other nations in introducing it, though it require an expenditure of millions of money. The government appears to understand and share fully the feeling of the people, and considers it its duty to further what will tend to fulfill these demands. And furthermore, as what is done is meant for use and for continual use, it must be well done. Other things meet with less encouragement. If any great increase of personal comfort or domestic convenience can be forcibly shown to result from any improvement, it is very likely that an Englishman will sometime adopt it, but he will probably not make haste to do so, nor will he turn aside to investigate beforehand what it may be likely to accomplish. Such things he is quite willing to allow everybody else to experiment with before him: when they have reached a good result he will begin to take some notice of them.

AMERICAN INVENTION PERFECTS COMFORT.

In America the case is as nearly as possible the reverse of all this. True there are plenty of men deeply absorbed in business, and interested in any thing which tends to promote its interests, but as a rule they have not the means to carry out any very extensive undertakings. The magnitude of the country renders the difficulty so much the greater, and to maintain railway communication over such great distances it is necessary that roads should be constructed with the least possible outlay. As for governmental encouragement—well I don't think I need say anything about that, for our representatives are so much occupied with looking after the welfare of the country that they of course cannot attend to any such matters as these. Necessity is the mother of invention, and it is this which has given our countrymen a world-wide reputation for ingenuity such as is possessed by no other people. The very fact of our having to construct cheap and primitive railways has compelled us to design locomotives which would adapt themselves to them, as experience in Canada has abundantly shown that rigid English engines are totally useless on American roads. We accordingly find a great variety of devices brought out in the American locomotive which render it a machine most admirably adapted to its work, and of late years most of these have been more or less adopted in England.

But again, the American not being brought up in entire dependence on servants, is quite familiar with most of the details of household affairs, and knowing in many cases that much of the burden of such matters must be borne by his wife, he sets himself to lighten that load as far as may be by manifold ingenious contrivances to lessen labor and hasten results. Exposed to severe cold in winter and oppressive heat in summer, he builds his house so as to shield him from either extreme, and then finds numberless appliances which he can introduce into it to make it a comfortable abode for himself and family. And so we might continue to illustrate how the apparently unfavorable circumstances in which he is placed and the entire dependence which he is obliged to place upon himself have made him thorough master of all that tends to make him comfortable and to lighten domestic labor. It is in America therefore that we should naturally expect such great and useful inventions as sewing machines, clothes wringers, cooking stoves, hot-air furnaces, sleeping cars, luxurious steamboats, and the host of similar appliances which are so frequently and well illustrated in the pages of the SCIENTIFIC AMERICAN; nor is it but a step further to such as steam fire engines, breech-loading rifles and the like.

SUPERIORITY OF BRITISH POSTAL CONVENIENCES.

But I have already occupied more space than I intended with this comparison. What I wished to do was to give an illustration of some of the commercial facilities which are provided in England, as it is in such matters that we can learn most from them, and that I take it is the object of all comparison. I have already in former letters spoken of the conveniences of underground, and especially *above*-ground railways, and very much more might be said without any danger of exhausting the subject or unduly lauding it. I think, however, that a few remarks on the *mail service* may be quite as interesting and the subject hardly less important.

HOW NOT TO DO IT—HOW TO DO IT.

To those who have dropped a letter addressed to a Broadway firm into the box at one of the up-town lamp posts on Monday and had it safely delivered at its destination as early as Wednesday of the same week, having perhaps in the mean time called in person at the house for which it was intended, the advantages of the system existing in London may perhaps be appreciable. There are some six or eight collections and deliveries during the day, and the officials there seem to think it as well, when they have received a letter for a city address, to deliver it the next time the postman goes his round. Accordingly if you post your billet at eleven in the morning your friend will no doubt receive it before three, and probably in that way you will have saved a day in the accomplishment of your business. To facilitate city collection and distribution it is usual to have two boxes side by side, one marked in red letters, "For London and twelve miles around," and the other in black, "Inland, Colonial and Foreign Mails." Should you by mistake, however, drop your letter into the wrong box, it will make no difference except that perhaps it may not be delivered till the next morning instead of in the afternoon. The carriers all wear a simple and convenient uniform, and this I think a very good thing if only for appearance's sake, since it is proper that government officials intrusted with valuable property should be distinguished by some mark of their business.

THE GREAT UNIVERSAL NIGHT MAIL.

For the provincial towns there are mails during the day, but the principal one is at night, and this is the one which especially deserves our notice and (would that it might be) our imitation. The train leaves London at 8:40 P. M., before which hour it may be presumed most business letters will be ready for dispatch. After the regular closing of the mail another box is open at the general, and at one of the branch offices, in which letters bearing an extra penny stamp can be posted up to the time the mail actually leaves the office; and after this letters with two extra stamps may be posted in the traveling post-office at the railway station till the time of its departure. The train is one provided expressly for the service and called the "Limited Mail," from the fact that only a limited number of passengers are taken. Seats may be secured in advance, but ordinary tickets are not available unless there happens to be room in the carriages. For the purpose of seeing the operation of this, I made the journey between London and Glasgow by this train a short time since. The distance is 400 miles, and the through time less than 10½ hours, out of which about one hour is consumed by thirteen stops. The average speed, therefore, for the whole distance (a part of the way being over heavy gradients) is considerably over 40 miles an hour, and it frequently rises to nearly or quite 60. The "Limited Mail" forms a trunk from which branch off, at certain stations along the line, mails for all the provincial towns, so that not only do the merchants in Glasgow and Edinburgh find their letters, written after business hours in London the previous evening, awaiting them on their arrival at their offices, but the same is true in every other city and town in the country. A similar train leaves Glasgow somewhat earlier in the evening and reaches London at a little before 5 A. M., the running time being the same, and this starting with a single carriage and post-office, receives the contributions of all the towns as it passes along till it reaches London with all the affairs of the nation on its shoulders. The traveling post-office vans are well arranged for the work of assorting the letters for the various branch lines. The sides are lined with boxes labeled with the names of all the principal towns, and into these the clerks rapidly distribute the mail as they are whirled along on their nocturnal course.

This service is undertaken by the London and Northwestern Railway, and it has been accomplished at no little expense. They are of course compensated by the government, as the number of passengers is much too small to defray the expenses of the train and all attendance that it is necessary to provide for at the various points along the route. It will be seen how well adapted Mr. Ramsbottom's water troughs are for facilitating such a service, as the engines are obliged to carry but very little dead weight in the form of water, having it ready beneath them at short intervals to be scooped up without stopping.

The same attention to the requirements of the public extends through the other branches of the post-office, the dead letter office, etc. While delay in the transmission of a letter is a rare occurrence, the actual loss of one is still less frequent. In short, the arrangements throughout are such as one would expect to find in a nation with whom, as correctly stated in the first part of my letter, business is the first and great thing.

A very interesting article might also be written on the telegraph companies, which, though not under government supervision in the same way as the postal service, are still very similar to that in their extensive and business-like operations. And another system which deserves much more notice than the few closing lines of a letter, is that for the carriage and delivery of parcels. Instead of this being done through the agency of express companies, the railways themselves undertake it, and this is attended with great convenience to the public. There are offices at numerous points in the cities at which, or at the stations, parcels may be left for dispatch, and the railway companies have their own wagons and attend to the safe delivery themselves, the charge being but trifling.

SLADE.

A POWERFUL LOCOMOTIVE is now building at Bordentown for the Camden and Amboy Railroad. It is a ten-wheel engine with six 4½-feet drivers, intended for coal traffic, and calculated to draw the heaviest coal trains unaided.

Heliography, or Sun-Engraving.

Mr. Charles Nègre of Avignon described his beautiful process of chemical steel engraving before the Photographic Society of Paris, at the last meeting reported in our foreign exchanges of March 1st. The steel plate is first coated with a varnish of some soluble substance mixed with bichromate of potash, which has the property of becoming fixed, or insoluble in water, by the action of light. This coating is then exposed to the wrong side of the negative obtained directly in the camera, and the light transmitted through the light portions of the negative fixes the varnish, while the dark parts leave it soluble so far as covered by them. The soluble portion of the varnish being washed off, the residue perfectly represents the lights of the negative, which are the shades of the future picture. The plate is then placed in a gold bath and submitted to the action of electricity, which beautifully gilds the exposed parts of the surface with a layer of gold inseparable from the steel, and distributed of course to the minutest points unprotected by the fixed varnish. All that remains is to clean off the fixed varnish and subject the surface to the action of diluted acid, which has no effect upon the gilded parts, but etches the exposed surface of steel with a delicate exactness which no manual skill could imitate. The plate is now ready to give impressions with ink, although it will of course receive any desired additions or alterations at the hands of the engraver. The process is of inestimable value both to the investigation and diffusion of science, and with the aid of the microscope will introduce to common view many of the most instructive and curious *minutiæ* of nature.

Colored prints are also obtained by a similar but shorter process, by Mr. Pouncy, of Dorchester, England. A similar sensitized coating mixed with oil color of any desired tint, is used on translucent paper, and when the portion protected from fixing by the dark parts of the negative has been washed off, the remainder, constituting the shades of the picture, is transferred as in lithography to any surface upon which it is to be impressed, or if ceramic colors are employed, it may be transferred to potter's "biscuit," and burnt in as a design upon any description of ware.

Mr. Osborn's method, for applying which on a large scale a company has been formed in this city, employs a sensitized coating of a preparation transferable to lithographic stone, and thus obtains an engraving for printing.

Our Cast Car Wheels.

It is often said that figures do not lie, but we cannot see with what reason it is said, for they certainly tell very different stories for some purposes than others. The *American Railroad Journal* finds statistics quite contradictory to those of the apostle of chilled wheels in England, from whom we quoted not long since. That paper estimates that not less than *ten thousand broken wheels* are taken out from under cars and engines on our roads in a year. The system of ringing every wheel with a hammer at the principal stopping places, as practiced generally on our railroads, detects the most of these fractures before they are completed; but no less than four serious accidents have occurred from this cause within the last winter. Deepening the chill and then annealing the center, may mitigate the evil, but nothing has yet done away the brittleness that comes of hardening, in cast iron. The majority of chilled wheels break in the tread, and probably always will. The very process involves actual cracking in many cases, and in still more an approach to cracking, in the form of a concealed over-tension which percussion in use will soon bring to fracture.

How to Buy Meat.

Dr. Letheby gives the following description of good and bad meats, with which his duties as sanitary officer in the city of London have required him to be very familiar:—Good meat is neither of a pale pinkish nor a deep purple tint. It has a marbled appearance, from a ramification of little veins of intercellular fat; and the fat of the internal organs especially is firm, hard and suety, and is never wet, whereas that of diseased meat is soft and watery. The feel of healthy meat is somewhat elastic, and hardly moistens the finger. Diseased meat is soft and wet. Good meat has but little odor, and this is not disagreeable; whereas diseased meat smells faint and cadaverous. Good meat bears cooking without much shrinking or losing much of its weight; but bad meat shrivels up and boils to pieces; this is due to the larger proportion of watery and gelatinous material, and the absence of fat and true muscular substance in the meat. Under the microscope the fiber should be clear and well defined, and free from infusorial animalculæ; while that of diseased meat is sodden and tumid, as if it had been soaked in water, the transverse streaks are indistinct and wide apart, and animalculæ abound in it.

ANOTHER PRESERVATIVE for animal substances, not very different from the *eau hemostatique* or blood-staying water, has been presented to the French Academy. It is composed of alum, benzine and water, and is said to cover the substance to be preserved with a sort of filtering cuticle, excluding the decomposing animalcules according to Pasteur, while admitting pure air and allowing free evaporation. That air has in itself no tendency to promote decay, accords with common experience, though not with the common impression. The butcher keeps his meat in a current of dry pure air, and a carcase hung up in the elevated atmosphere of some of our Rocky Mountain regions, will dry perfectly sweet and sound throughout, without other curing. Putting these facts and Pasteur's discovery together, is there not probably a practicable principle which may be applied to the preservation of fruits and meats, and even of the human body, without the aid of a vacuum?

Editorial Summary.

CASELLI'S PANTELEGRAPH—introduced some ten years ago—does not appear to have made the rapid progress of machines which attempt less perfect results: but we see it noticed among the variety of instruments now used in France. As our readers may perhaps remember, it produces a *fac simile* of the dispatch as written by the sender on a non-conductive surface with a chemical ink which gives a conductive quality to the portion covered by it. The document is fed by clock-work under the point of a pendulum which forms part of the circuit and oscillates in exact time with a similar conductor at the receiving station—the latter receiving the current through a sensitized paper placed like that through which the sending current is transmitted. As the transmitting pendulum swings over the face of the dispatch, the current, passing through the conductive part of the surface only, transmits to the receiving paper a correspondent succession of marks, and as the dispatch is fed forward a thread's breadth at each oscillation, the receiving paper consequently presents a *fac simile* of the handwriting, drawing, or any figure traced upon the transmitting paper.

TESTING STEEL RAILS.—The test at the "Cyclops" steel works, Sheffield, is a blow from a tun hammer dropped from a hight of 36½ feet, and striking with a V-corner upon the rail midway between supports placed three feet apart. It is apparent that this test is grossly disproportionate as to tensile strength or toughness, in comparison to hardness, which is the great virtue required, in the face of the rail. Nevertheless, a steel rail at Chalk Farm is said to be now wearing out the twenty-fifth face of iron rails adjoining it. At a special professional test, held in Sheffield, in February last, the 68-lb. double headed steel rail was bent at a right angle by the third blow of the tun hammer, falling thirty feet: the first, with a fall of 20 feet, having bent the rail 5 inches in a length of four feet, and the second having straightened it back. No cracking was produced. A hydraulic pressure of 20 tuns on a similar rail caused a deflection of $\frac{5}{16}$ inch, and a permanent set of ¼ inch. Thirty tuns gave a deflection of 2½ inches and a permanent set of 2.55 inches.

HOW IS IT?—We observe in the Detroit *Union* a circumstantial report of the deliberate medical murder of a little daughter of Alfred Woodruff, of Greenfield, seven miles from Detroit, who died, as alleged, not of hydrophobia, with which she was hopelessly suffering, but by *smothering*, resolved on by "science and skill" after "a long and painful consultation." If this be, as we presume, a silly repetition of vulgar misreport, its authoritative exposure is of the highest importance. The matter of such a publication should not be passed over, for the impression is very general, as we happen to know, among the uneducated classes, that smothering to death in cases of hydrophobia is a usual practice, allowed by medical jurisprudence; and while every opportunity should be taken to eradicate so demoralizing an impression, at least an uncontradicted statement in a respectable daily paper ought by no means to be allowed to confirm it.

TESTING BESSEMER STEEL for carbon, is done in a simple manner by the English manufacturers. A standard piece of steel is kept on hand, in which the proportion of carbon has been accurately determined by chemical analysis. A few filings from this are dissolved in nitric acid of a certain gravity and kept in a vial. The shade of brown given to nitric acid by a certain proportion of carbon is very exact and uniform, and hence, a specimen of exact weight being taken from each charge and dissolved in half the standard weight of acid, and the solution then diluted with water until it reaches the exact color of the standard solution, the comparative specific gravity of the two solutions will determine the proportion of carbon in the specimen, to a hundredth of one per cent. There is not the slightest appreciable variation of ingredients, throughout different parts of the same charge.

BEEF-CURING BY VENOUS INJECTION is practised by a firm at Corpus Christi, Texas, according to report, with perfect success. The blood is withdrawn by tapping the right ventricle of the heart—the animal having been stunned—after which the veins are forcibly injected with brine through a hose the nozzle of which is tightly inserted in an orifice in the left ventricle while the orifice in the right ventricle is closed. After filling, the right ventricle is opened, and allowed, under a continued pressure of brine, to run clear of the remaining blood. On making an incision at any point in the carcase, the brine spirts out the same as blood from the living animal, only with greater force. Even the hide is perfectly salted, and the carcase can be kept or transported whole as it stands, or skinned, cut up and packed, with perfect safety from decomposition.

MAGNESIA CRUCIBLES are proposed for obtaining compact steel or iron, free from the bubbles which are due to the action of the carbon on the silica of the ordinary crucibles. Lime crucibles for the same purpose may be formed within the ordinary clay crucible, by first ramming the latter with plumbago, then turning out the plumbago to a thin shell, then ramming with caustic lime and turning the proper cavity. The use of the plumbago between the clay and the inner shell, is to prevent the melting of the latter from contact with the clay in the furnace.

GLYCONINE.—Four parts weight of yolk of eggs, with five parts of glycerin, make an unctuous compound of the consistency of honey, unalterable by the atmosphere, and forming an inoffensive covering for sore or injured parts, impervious to air, yet easily removed by water.

THE SPRENGEL AIR PUMP is an instrument of beautiful simplicity and said to be a great improvement on the common kind in point of efficiency. The vessel to be exhausted is connected by a branch pipe to a vertical tube through which successive drops of mercury are allowed to fall from a reservoir at its top. Each drop carries the air clean before it, the vacuum created being filled from the vessel to be exhausted, and the process is continued as rapidly as the drops can succeed one another, until a perfect Torricellian vacuum is realized, as shown by a barometer opening into the branch pipe, which, it is said, will mark as high as a close barometer by the side of it.

A NEW GAS ENGINE by M. Hugon—who claims to have invented and discarded, fourteen years ago, the Lenoir electro-gas engine—substitutes a constant gas light for the electric spark, to explode the mixture of gas and air in the cylinder. The gas jets which fire the mixture, and are of course extinguished by the explosion, flow by flexible pipes through orifices in the ends of the slide valve, and as often as extinguished are relighted by constantly burning jets which they meet in their oscillations. A very small jet of water is also introduced into the cylinder at each explosion, which by its instant vaporization extracts heat and serves moreover as a partial lubricator.

VALUE OF FUEL BY THEORY.—1 lb. of carbon in burning gives 14,400 units of heat. 14,400×772—11,116,800 foot lbs. On the supposition that 1 hour is occupied in the burning, then 11,116,800÷60—185,280 foot lbs., represents the mechanical value of the heat for one minute. 185,280÷33,000—56 horse power. In other words the mechanical value of one pound of carbon burned in one hour is 5·6 horse power, and one horse-power per hour is equivalent to 1÷5·6 lbs. carbon burned per hour. Thus it will be seen that our engineers realize only about 5 per cent of the value of fuel.

PARKESINE.—This is the name applied, in honor of its inventor, to a coarse collodion discovered by Mr. Alexander Parkes, of Birmingham, and introduced at the Exhibition of 1862. It is now alleged that the article can be produced at a cost of only a few cents per pound, and that its qualities are similar and equal to those of hard rubber, with the advantage of every variety of color from the purest white downward, and of resisting the action of water and heat. Specimens illustrating all the properties claimed, are to be at the Paris Exposition.

ALMOST PERPETUAL MOTION.—We saw lately a watch which never needs winding up. It was bought in Paris by one of our friends, and looks very much like perpetual motion. It is inclosed in a gold hunting case, and on examining it we found that the closing of the case, after looking at the time, performed the function of winding up in an almost imperceptible manner. It was stated to run a month without interruption, and all that is necessary to keep it going is to see the time at least once a month.

AMERICAN IRON FOR ENGLISH GUNS.—It is well known that the English have been unsuccessful in procuring a cast iron gun like our "Rodman," for want, it is supposed, of the proper quality of iron. It is reported that the Admiralty have obtained through the British Minister, Sir Frederick Bruce, samples of the Pennsylvania iron from which our monster guns are cast, for the purpose of further experiments in casting heavy ordnance.

WET AND DRY LUBRICANTS are each attracting much attention in Europe. The water-box of the French inventor vies with the dry, impalpable plumbago powder of the Battersea Plumbago Crucible Company: both being reported as giving results decidedly superior to oil, under comparative tests. The plumbago powder is said to adhere to the surface of the metal, perfectly filling the finest inequalities.

FILTRATION AND REFRIGERATION OF AIR.—A simple machine patented by a Mr. Cabanes, consists in principle of a rotary fan drawing a powerful current of air through a case packed with sponges which may be saturated with any purifying, ozonizing, or freezing mixture, and thus a cool, pure, fresh, or if you please perfumed breeze may be enjoyed in any situation and at any season.

TANNING BY PNEUMATIC PRESSURE, for effecting which by a new method a patent has been taken out in Europe, is no doubt substantially the same thing as tanning in a vacuum, which we lately noticed as introduced in Illinois: the effect in either case being to force the tanning liquid rapidly through the pores of the hides, and thus reduce the time of this process from months to hours.

CYANOGEN, a deadly gas, is found in England among the constant products of the combustion of bituminous coal. In iron furnaces 1·34 per cent by volume of the gas present is cyanogen, at a hight of 2½ feet, while at a hight of 12 feet hardly a trace of it can be detected. A bad draft may give the occupants of a room thus warmed, more chemical poisons than they suspect.

THE SNIDER RIFLE is not giving satisfaction under the English army tests. It is found deficient as compared with the Enfield rifle in accuracy, rapidity and range, and develops serious defects in the working of the ammunition, partly from faulty workmanship.

SUBSTITUTE FOR ALBUMEN.—It has recently been found by Thom, Roberts, and Rosenstath, from a long series of experiments, that dried gluten, or lucine, employed under new conditions, fixes colors as solidly as albumen, and may be substituted for it with considerable economy.

TRACK-LAYING MACHINE.—A California inventor has produced a model of a machine for laying railroad track, ties truing and all, at the rate of 2½ miles in 12 hours. The grade being ready for the track, the machine moves forward, projecting a leveling scraper before it, and dropping the ties at exact distances from the open arms of a large wheel revolved by the forward movement. As each sleeper drops, four heavy stamps drop upon it, bed it firmly in the earth and hold it still while two planing-machines cut the seat at each end for the rail or chair, to the proper depth. When ties enough for a length of rail are laid, the machine stops for a moment while a rail is lowered from each side by automatic cranes to be adjusted and spiked at leisure by the attendants.

AN ELECTRIC RIFLE has been made by a Frenchman, with a sufficient battery inclosed in the stock, the wires from which emerge near the breech and are connected by a simple movement with a very fine platinum wire within the charge, which is thus rendered incandescent. Practically, such an arrangement has more chance of being useful in artillery. The French are a wonderful people for wonderful inventions.

GRANULATED GUN COTTON is offered for military purposes, by a process which consists in reducing the gun cotton to a paper pulp, solidifying it by pressure, cutting it up, and finally varnishing the grains with collodion. Or, the pulp is mixed with a small proportion of gum or collodion and agitated in a vessel until granulation results.

THE ALLOYS OF STEEL WITH PLATINUM are said to be very perfect in every proportion that has been tried. The best proportion for edge instruments is about 1·5 per cent of the latter metal. Equal parts by weight form a beautiful alloy which takes a fine polish and does not tarnish: the color is the finest imaginable for a mirror.

MR. WHITWORTH maintains the superiority of his flat-fronted shot and shell as the only form for penetrating armor at various angles. He admits that the ogival head gives the best penetration at right angles, but maintains that an enemy cannot be expected to present himself in that favorable position as a target.

PRUSSIA.—A correspondent calls our attention to a very large statement of the recent increase of the Prussian marine, contained in one of our foreign clippings some time ago. We have not the statistics of the great German ports now Prussian, and cannot say how far the statement may have been exaggerated.

HYDRO-CARBON GASES are obtained and burned on a new plan by a Russian who is said to be applying it to the engine of a small steamboat to run on the Neva. Air is forced through turpentine or other oils, emerging charged with their vapor, and burning with intense heat. The effectiveness of the method seems more probable than its safety.

A VERY SIMPLE "HYGRODEIK" is a few grains of quicklime laid on a plate. If it does not absorb more than one fortieth of its own weight of water in twenty-four hours, as determined by accurate weighing, the room, says Dr. Coffee, may be fit to live in. In a damp, newly built room, it will increase as much as five per cent.

A FIREMAN'S PROTECTOR, recently tested in Quebec, consists of a finely perforated brass ball attached to the nozzle about where it joins the hose, so as to present itself toward the fireman when playing upon the fire, and to throw over him a heavy spray of water as a protector from the heat.

PARAFFINE WATER-PROOF.—Dr. Stenhouse, says *Chambers' Journal*, announces that leather may be made water-proof and its durability doubled at the same time, by applying repeated coatings of paraffine and oil, the absorption being assisted by warmth.

SCOTCH SNOW PLOW.—The Highland Railway, Scotland, is subject to very heavy drifts of snow. Plows are used which, driven by five or six engines, clean the track of ten feet of snow at the rate of 25 miles an hour in new snow, and 10 or 15 in tough snow.

"VIENNA," says the *Nord*, "is the only city in the world where the snow is removed as fast as it falls, but the expense is enormous. All the men out of work are set to sweep the streets at 60 kreutzers [about 34 cents] a day."

AN ENORMOUS CAPITAL.—£70,000,000, or over $300,000,000 are said (in *Engineering*) to be invested in the London and North-western Railway and its leased lines. It has now 80 miles of steel track.

AMERICAN-PATTERN LOCOMOTIVES have been ordered in England to a considerable extent for foreign railways, and one large firm have lately gone into the manufacture of such engines.

HARD-SURFACE CASTING.—Iron cast in molds lined with a paste of finely pulverized metallic antimony and alcohol, will be covered with an extremely hard alloy of antimony and iron.

TRADES UNION TYRANNY is rampant in Sheffield. All the file makers are reported on a strike on account of the employment of a single non-union workman by one of the manufacturers.

STEEL CRANKS.—Ramsbottom saws his steel cranks out of a plain flat slab.

INCINERATION OR BURIAL.

A correspondent has taken the trouble to send us from a long distance (San Francisco), an article on the above topic which editors there had thought useless to publish. Independently of the quality of the production, we are inclined to think that Christendom, whether wisely or not, is so generally set against burning its dead as to justify the editorial conclusion. It can do no harm, however, to look at the question, and it may be instructive to glance at the conduct and experience of other races and times in relation to this interesting subject.

The utilitarian arguments for burning the dead are of great absolute force, especially in cities and populous regions. If ample room could be secured in perpetuity for all the generations of the living to rest at last forever undisturbed beneath the ground, one of the strongest of these arguments would be taken away. But this cannot be, at least in the ordinary manner, unless the whole term of mortal life on this small planet is destined to a restriction which has not been unequivocally revealed. It is true that we need not concern ourselves about exigencies which can only arise in the course of thousands of years, may never arise at all, or may be met by means now unimagined, long before they arise. But local necessities do arise which render the burial system extremely inconvenient, to say the least. It is impossible to locate burial grounds with an absolute certainty that it will never be imperatively necessary to invade and disturb them. No treatment of the dead could be more revolting to humane sensibility than the indecent scenes which have been enacted in this and many other cities when the interest of the living has prompted the removal of past generations of the dead from their once sacred resting places. Could they and those who loved them have had a voice in the matter, none can doubt that they would have preferred the funeral pyre or the calcining retort to the shovel and cart and the ghoul-like hands of the plunder-seeking laborer twice imbruted by a brutal task. Burning or anything that should prevent forever the recurrence of such desecration, would lend a grace to our civilization beyond what it can boast as yet.

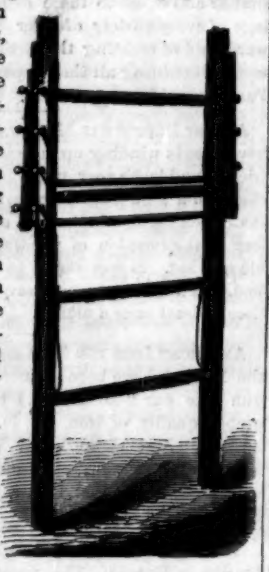
In all old and densely populated countries, close and even cumulative burial has become an evil not only brutal and brutalizing in its necessary incidents, but pestilential in its effects. It might be just (though of no practical use) to urge greater liberality in the appropriation for the dead, but for the fact that in some countries every foot of land devoted to waste subtracts from the daily bread of the poor. It is not practically possible and not always even humane, to enforce a sufficient liberality in land to prevent close burial in such circumstances, while men are what they are. The consequence is that the ground sometimes becomes saturated with the products of decomposition and can absorb no more, but yields them to the atmosphere in pestilential gases. Long before this extreme result is reached, however, the rank soil becomes prolific of deadly exhalations, and communicates poison to subterranean water currents and thence to wells. The mortuary records of such localities give abundant evidence of the effect, and that with fearful emphasis in times of pestilence. The ancients felt wisely though they reasoned rudely that the burial of the dead among the abodes of the living was a pollution to be prohibited. It seems as if burial could hardly be maintained with propriety for dense populations without eventually far more liberal appropriations—the construction of subterranean cities of the dead, for example—unless, which is perhaps more likely, the progress of science shall reveal some cheap and effectual means for general embalming. Again, the practice of burial incurs the risk of burying alive; a source of greater suffering on the whole in anticipation than in consequence. A kindred dread possesses the mass of mankind in regard to "being put in the ground" after death. It is rather a degrading apprehension, and really counteracts to a large extent the conviction and the consolation of immortality. Possibly if the vote of mankind were taken in reference to the disposal of their own bodies, the decision of the majority might not be the same as if we should vote in the character of survivors; fondly clinging, as we do in that capacity, to the longest preservation of the mortal remains, even beyond our sight; just as old letters and other relics, which we feel that we can never bear to look at, we can as little bear to burn.

The general history of incineration and burial is highly suggestive, and not favorable, in weight of example, to the former. The ancient Egyptians carried "reverence for the dust of man" to a degree of scrupulous and expensive care which has never been emulated except by individuals. The Romans, originally the most virtuous and humane in their stern fashion of all the great heathen nations, preserved their dead generally by burial until the times of the emperors, when faith, honor and purity had become nearly extinct, and burning the dead became the general custom until the predominance of Christianity put an end to it and substituted burial, in Rome and in the fiercely barbarous parts of Europe where burning had prevailed, as in Britain, from remote ages. The Hebrews practiced burial, as every reader of the Books of Moses may remember, and this was the custom of Abraham and his contemporaries (Genesis xxiii., 6); hence, probably of the few former generations back to Noah, and also back of Noah and the deluge. The Greeks practiced burial and burning indifferently, according to individual preference or circumstances. It is unnecessary to add that all Christian communities have adhered tenaciously to burial, thus far. Indeed there seems to be a historical and instinctive if not rational connection between the preservation of the body and the hope of resurrection as well as the general moral vigor of races. The virtuous North American Indian always buried, and the civilized but dissolute Asiatic has generally burned. The same principles which produce a polite, skeptical and materialistic civilization seem to have operated to extinguish the imaginative and religious tenderness for the human body which makes us cling to burial and constantly improve and refine its incidents. We need but mention, finally, the serious addition which burning would make to the chances of impunity in crime, by destroying the only evidence in many cases before suspicion was aroused. On the whole, we are inclined to think that the true direction for improvement is that of more reverent and secure preservation rather than of summary destruction.

SEEMAN & CATROW'S FOLDING CLOTHES HORSE.

The form and construction of this clothes horse is plainly seen in the two engravings presented herewith. The two

supports are hinged at the top so as to be closed when not in use, the horizontal bars being pivoted to the uprights and closing against the sides. When in position for use the ends lock, as seen in the engraving. The horizontal bars on which the clothes are hung are so arranged with reference to one another that in no case will the fabrics overlap or interfere with the free circulation of air. For the amount of drying surface which this horse exposes to the air, the contrivance, when in use, takes up less room than many others intended for the same purpose. It can be instantly folded or expanded, and is durable, simple, and cheaply manufactured.



State, district, and manufacturer's rights are for sale, or the whole patent right can be obtained on reasonable terms from the patentees, Seeman & Catrow, Middletown, Ohio. This improvement was patented through the Scientific American Patent Agency, January 22, 1867.

[For the Scientific American.]

THE STEAM INDICATOR—ITS VALUE AND USE.

Since we have had an instrument that is reliable for all speeds and conditions of the steam engine the indicator is becoming popular and its use is being called to the aid of the constructing engineer, the users of steam engines, and particularly to landlords letting power and their tenants. Owing to the imperfection of instruments formerly used, especially for engines that made more than twenty revolutions per minute, much doubt was justly felt with regard to the indicator being a correct measure of a steam engine or of its condition. Fortunately this difficulty is removed by the invention of a new instrument. Engines can now be correctly indicated under any attainable speed. To show the accuracy and uniformity of its action, I will, as an example, give the following: I applied a pair of indicators (one at each end of the cylinder) to an engine 20·5 by 48 inches, making fifty revolutions per minute, variable cut-off by the governor, valves badly set, one end doing three fourths of the work. I took six pairs of diagrams each day for three successive days, thirty-six diagrams in all, varying from twelve horse-power to seventy-five horse-power. I worked them all up separately. I then divided the average pressure per square inch on the piston by the horse-power indicator, and found the quotient four; showing that it required four pounds pressure for each horse-power. This result was uniform without a fraction on all the 36 diagrams. It would seem that this proves beyond a doubt that the two instruments were alike, uniform in their indications, and that it is practicable to measure the diagrams exactly.

Now, it has been questioned by some engineers that the indicator is a correct measurer of the steam engine! Let the above statement be analyzed and I think no reasonable doubt can be entertained for a moment of its uniformity; this conceded the next question is, is it mechanically correct? I answer that there is the same facility to make it correct as there is any weighing apparatus, and equal ability to test it.

The greatest opponents the indicator has are those whose secrets it reveals. It has spoiled many a theory and revealed bad proportions and arrangements of valves, ports, etc. It shows strong and incontestible facts in favor of working steam expansively—hence the opponents of expansion have to condemn it or admit their error.

So long as it is uniform in its action it is reliable as a measure. I care not what you call the result; horse-power, indicated horse-power, or, if you please, indigrams, it is a measure of power exerted and shows the exact condition of the engine and the action of the steam inside.

Inasmuch as many engineers using the instrument have made working up of the diagrams a mystery, and with one exception—Chief-Engineer King, U. S. N.—in his "Notes on Steam"—the writers on the subject have mystified the mystery, I will in a future paper give rules, very simple rules, for using the indicator.

F. W. BACON.

84 John street, New York.

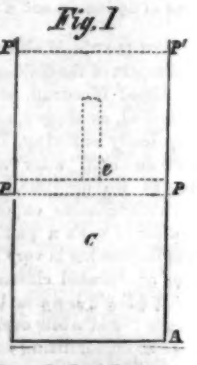
Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Unit of Heat—Mr. Morley's Fallacy.

MESSRS. EDITORS:—Permit me to say a few words in reply to Mr. Morley's article on "The Mechanical Equivalent of Heat," concluded on page 169. The writer of that article finds that the piston, *e*, in the figure may be raised one foot, from P to P′, by the application of an outside force which he computes at an average of 540 foot lbs., and as a corollary deduction thinks that 540 foot lbs. is all the work done in the case. He seems to have overlooked the fact that the inclosed air loses heat by expansion. This loss of heat (computed by the rule from Prof. Rankine, given in your issue of March 24, 1866), would be 121·4°. If the specific heat of air, with the pressure constant, is 0·24, the absolute specific heat, from the data given by Tyndall, is 0·17, and the quantity of water equal in absolute heat to the cubic foot of air is 1·29×0·17—0·22 oz. But 0·22 oz. of water cooled 121·4° is equal to 1·67 lbs. cooled 1°, or the destruction of 1·67 units of heat.

Fig. 1



By Prof. Rankine's rule, also, if the pressure of the atmosphere on the piston be 2160 lbs., and the expansive force of the inclosed air equal to it when the piston is at P, the expansive force or upward pressure on the piston is reduced to 814 lbs., producing a partial vacuum of 1346 lbs., when the piston is raised to P′, without the application of heat. If the vacuum increased at the uniform rate of 1346 lbs. per foot, the average would be 673 lbs., but the variation of the rate of increase is such that the average is 856 lbs.; hence the work done by the application of outside force is 856 foot lbs. This leaves 1,304 foot lbs. to be accounted for by the destruction of 121·4° of the heat of the inclosed air.

But we have already seen that that destruction amounts to 1·67 units of heat. Dividing 1,304 by 1·67 gives 781 foot lbs., from the data taken in this case, as the equivalent of one unit of heat.

The second case supposed by Mr. Morley "to vary the proposition," only requires a corresponding computation on the same basis to bring the same result.

The difference of 9 foot lbs. between this result and the accepted equivalent may be ascribed to slight errors in the data used. For instance, Prof. Tyndall's estimate of the pressure of air of the given density, differs from that given by some other good authorities, by more than enough to account for the excess.

The accepted equivalent of heat may not be perfectly correct, I only contend that the method of calculation of Dr. Mayer as given by Tyndall, contains no radical error or defect.

O. A. BENTON.

Leedsville, N. Y., March 18, 1867.

[The above exposes pretty plainly the fallacy of Mr. Morley's reasoning to those who are familiar with the data used. To others the following suggestions will have more weight. No one can doubt that in Tyndall's illustration the air (2,160 lbs.) is lifted. What lifted it? Was the lifting force due solely to heat as Mayer assumes, or did the initial elastic force of the air contribute something? At the end of the raising, the air has the same elastic force or tension as at the beginning, and therefore none of it could have been used or consumed in doing the work. We consider Mayer's method of determining the mechanical equivalent of heat impregnable and one of the happiest thoughts of the nineteenth century.—We have received in addition to the above communications several others of similar purport and of equal merit; if our paper were large enough it would afford us pleasure to print all of them.—EDS.

Our Iron Clad Navy.

Allow me, Messrs. Editors, to briefly state my reasons for dissenting from some of the statements made by your correspondent, Y. Z., in No. 13, current volume. The bill of Mr. Grimes from which he anticipates so much benefit to our navy is, in my opinion, only an attempt to create an admiralty board, a creation which has not as yet been productive of such good results in England that we should crave its existence here. Your correspondent speaks of sixteen iron-clads, which "will not float and are entirely useless." I presume he refers to our draft monitors. Without intend-

ing to endorse or excuse the blunders committed by the Navy Department in constructing these vessels, it may be stated that fifteen out of the twenty have been increased in depth and the remainder altered to torpedo boats. They all float with sufficient buoyancy when fully equipped. He says that the *Dictator*, *Puritan*, *Roanoke* "are not safe for cruising at sea." Judging from my own experience with monitors I cannot but think this opinion absurd. In stating that the *Puritan* is of the same model of the *Dictator*, Y. Z., errs; the *Puritan* having some 800 tuns more displacement than her consort. It was decided to leave one turret off the *Puritan* so that the other could be made larger, in order to accommodate the 20 inch guns which have already been cast for her.

Your correspondent further says that "eight of the iron-clads were built after the model of the *Manhattan* of 844 tuns," and that "we have nine iron-clads of the *Canonicus* model of 1,034 tuns." Now as the *Manhattan* and the *Canonicus* are duplicates of the other, this statement is incorrect. Again he compares the *Monadnock* and the *Miantonomah*, having their seven inches of armor, with the *Kalamazoo*, etc., with fourteen inches of plating, and thinks "it is doubtful if they are equal to others."

It seems to me that the pointing out of these faults in his data is sufficient, without comment, to show that the conclusions of your correspondent ought not to be accepted as authority except with some reservations. In conclusion I would say that, with all their faults, our monitors stand now as superior to any war ships which float. In this I am sustained by the disinterested testimony and opinion of such a man as John Bourne, and the reports of those who have taken them into action. ENGINEER.

Boiler Explosions.

MESSRS. EDITORS:—I have been using steam for the past fifteen years and I have yet to see any thing confirmatory of the Colburn theory.

The causes of boiler explosions, apart from defect in material or manufacture, may be summed up as follows: Overheating, by which the boiler may be injured and the pressure of steam increased; irregular heating, by which one part is made very hot while another portion is comparatively cool, as when the water is allowed to get too low, thus destroying the equality of tension; or, the sudden cooling of a portion by cold water, thus contracting that portion while another part is expanded by heat.

A boiler would not explode merely by suddenly injecting a large quantity of cool water into the steam space; it would merely lower the pressure. But if the water was thrown against the hot plates it might cause an explosion, not from the amount of steam instantly generated, but from a sudden contracting of the metal.

I have known a locomotive with steam blowing off—at east ninety pounds to the square inch—to break through a bridge and be instantly immersed in water ten feet deep, without injury to the boiler. I have seen an exposed boiler working at seventy-five pounds pressure suddenly flooded with rain to such an extent that the pressure was lowered twenty pounds in as many minutes, but no explosion occurred. In both these cases the contraction of the metal by cooling was uniform. In the case of the *Ceres*, when the water rushed in upon the boilers causing an explosion, I account for the catastrophe by supposing that only a portion of the heated iron was reached at once, and that contracted before the water had time to reach the other parts. When a boiler explodes upon the starting or stopping of the engine or from a sudden jar, the inference is that it was before strained to its utmost capacity.

Mr. Colburn's theory can be easily tested. Get up steam on a boiler to, say forty pounds, then suddenly open the safety valve. The simple result will be a lowering instead of an increase of the pressure. J. J. REINHART.

Lovgootee, Ind.

Treatment of Steel in Hardening.

MESSRS. EDITORS:—Your correspondent, "V," in your issue of Feb. 16th, makes some remarks on the working of steel which are no doubt mainly correct, but I would, before indicating the color for the proper temper of the tools he enumerates, go back to the condition of the steel before it is tempered. Assuming that the steel in the bar was of a character best adapted for the desired tool, the first important question is, how has it been hammered? and next, how hardened? Some smiths hammer their steel more thoroughly than others. That the quality of their tools may be the same as others which have received less hammering, the color in tempering must be of a darker shade, and those who heat their steel a few degrees hotter to harden must give a corresponding deeper shade of color in tempering. Steel hardened in pure soft water requires more heat than the same steel hardened in brine or some metallic solution, or in other words the greater the conductibility and density of the bath the quicker the heat is abstracted from the steel. A comparatively low heat very quickly absorbed will make steel as hard as a higher heat more slowly chilled, but if we give the steel the same heat for the different baths we have different degrees of hardness that can only be regulated by difference of color when tempered.

The same subject receives a criticism from "W. L. D.," in issue March 23d, in which he attributes difference in temper to difference of color which the same steel with the same heat would assume with a fine or coarse polished surface. This is true, but I think the treatment of the steel in hammering, the heat it receives in hardening, with the density and conductibility of the hardening bath, are the chief contingencies to be considered in obtaining the proper temper, and unless due attention is paid to all of them, a standard for the degrees of heat necessary for tempering tools for different purposes will be of no avail. If a piece of steel is properly hammered and hardened it admits of more variation in the shades of tempering colors than when less attention has been paid in hammering, and will still be a good tool. B. F. S.

Connecticut, March 22, 1867.

Breakage of Chimneys.

MESSRS EDITORS:—The great cause of lamp chimneys being so brittle and breaking so easy, is owing to the material they are made from. (There is shoddy in glass as well as in cloth.) Cheapness being the order of the day a great many manufacturers make chimneys from silicate of lime instead of silicate of lead. The glass made from the silicate of lime has about the following proportions—sand, 100; soda, 45; lime, 20 to 25; nitre, 7 to 10. Lime being a non-conductor of heat the chimney will not bear the expansion caused by the heat, and if by gradual heating the chimney does not break on the lamp, a few times heating makes it so brittle that it breaks with the least effort at cleaning it no matter how much care is used.

The silicate of lead has about the following proportions;—sand, 100; lead, 40 to 50; soda, 20 to 25; niter, 10 to 15. Lead being very ductile and a good conductor of heat, a chimney made from this formula will almost melt before it will crack with the heat. The uninitiated may tell the difference of the chimneys made by these different qualities of glass by ringing them, the vibration from the lead glass chimney has a sweet bell like sound while the lime glass has a short harsh sound. The difference of the cost in manufacture is only in material, about 15 cents per dozen.

Another point is in annealing; chimneys as a general rule are not annealed; under a powerful microscope the difference can be seen in the glass, the particles in the annealed glass lie close and compact, while the unannealed seem ready to diverge.

There is more economy in using lead glass annealed chimneys at 15 cents each, then there is in using lime glass chimneys at 5 cents each. Cheap and dear are truly relative terms in this case.

AN OLD SUBSCRIBER TO YOUR VALUABLE JOURNAL.

Philadelphia, March 16, 1867.

Where the Day Begins.

MESSRS. EDITORS:—The criticisms of your correspondents on your article relative to the length of the day are very amusing. But are you not in error in supposing that the "day line" has not been definitely fixed? I am not aware of any special legislation upon the subject, but its position is practically defined by the regulations relative to the computation of longitude. The longitude of Greenwich (or Washington, if that is the starting point), is 0, and the meridians are numbered thence both eastward and westward to 180—just half-way around the earth. This 180th meridian is the "day line." For, since the day commences at midnight, when it is Monday, 12 M., at Greenwich, and midnight at 180, it is Monday throughout all the earth. A moment later Tuesday has commenced at the 180th meridian, and follows midnight westward. It is Monday still at all places westward from the place of midnight to the day line, and Tuesday from that point to the place of midnight. When it is midnight at Greenwich, it is Tuesday over all that half of the world called the Eastern Hemisphere, and Monday over the American half. It is the common practice of navigators to add a day to their reckoning whenever they cross the 180th meridian going westward, and subtract a day whenever they cross in the opposite direction. This, it is readily seen, will always bring them out on the right day of the week, no matter how many times they cruise from one day into another. It is a little remarkable that this 180th meridian from Greenwich lies wholly in the ocean, crossing scarcely a league of habitable ground. Thus is realized the ancient poetic fancy that the day is born from out the sea. D.

[The zero of longitude was not fixed upon with any reference to the question of day line, and there is no necessary relation between the two, and the agreement is not general that the meridian of 180° shall be the day line. Moreover, there are in use four different reckonings of longitude. England and the United States adopt Greenwich as the starting point, Germany and eastern Europe, Ferro (one of the Canary Islands); France, Paris; Spain, Madrid. But the reckoning of the day is practically the same all over Europe and America. When all the nations agree on a common zero of longitude, the day line will probably be made to accord with it.—EDS.

Yellow Rain.

MESSRS. EDITORS:—It seems that the days of miracles have not yet passed. On the night of the 12th inst. we in this section had a copious fall of rain of about two and a half inches, and such vessels as were left standing out were found to contain water impregnated with a yellow substance such as is contained in the inclosed vial. We learn to-day from Bowling Green, fourteen miles distant, that it was the same there, and the inhabitants, believing it to be sulphur, are somewhat alarmed, not knowing but what it is the beginning of a preparation of that great fire in which sinners expect to find themselves ensconced in a coming day! Whatever it is, we are not chemists enough to make out. Clothes that were lying out were made yellow with the substance. It seems to be odorless—has the resemblance of farina contained in the anthers of plants. It may be a fertilizer—who knows? If so, who can tell how much is received from the atmosphere in finer undiscernible particles throughout the year? Being ignorant ourselves, we would like to hear from you, who are more knowing. H. L. EADES.

South Union, Ky., March 13, 1867.

[There are many instances on record of solid substances ordinarily abiding on the ground or in the sea, falling down with the rain. Thus there have been showers of fish, frogs, insects, vegetable matters like pollen, and sand. When we remember the force of tornadoes, whirlwinds, and waterspouts, and how the moderate wind transports musketoes, we have a sufficient clue to an explanation. These extraordinary rains have always been a terror to superstitious people; in the yellow rain they smell sulphur, and in the red rain blood. A friend informs us that he has frequently seen red snow on the mountains in Colorado, and he is satisfied that the color comes from an insect. We will make a microscopic examination of the specimen received, and may be able to determine what kind of vegetable or animal it is and where it came from. Mr. Eades has our thanks for his courtesy in sending it.—EDS.

Terrific Explosion of a Spoonfull of Water.

MESSRS. EDITORS:—I see in your issue of the 23d inst., under the head, "Answers to Correspondents," some remarks on the explosive force of water when freezing. Some forty years ago, near Granville, Licking Co., Ohio, a heavy forge anvil, of some 1,000 lbs. or more, was damaged by a slight crack in one side some three inches deep, and an opening so slight as scarcely to admit the thinnest knife blade. It was tumbled out, and one terrible winter night, when filled with water, which could not have exceeded one table-spoonfull, the frost rent that mighty mass of iron in twain, with an explosion like a seventy-four pounder. In this case, wherein was the cause equal to the effect? B. F. E.

Dayton, Ohio, March 30th.

Science Familiarly Illustrated.

Adipocere.

A few days since Mr. E. Northrup a very worthy farmer of Newtown, Conn., brought us a very fine specimen of adipocere which had been taken from a peat bog. Several pounds of the curious substance had been collected by himself and neighbors, and hopes were raised that the bog might prove a veritable mine of soap and candles. To most of the villagers the substance was a great mystery, as to its nature and origin; but the theory prevailed that it was a mineral substance allied to petroleum and that it must be considered as a trustworthy "show" of oil.

It is probably the case that the word adipocere and the thing to which it is applied are unknown to most of our readers and we proceed to make the whole matter as plain as possible.

The word adipocere (derived from two Greek words which signify respectively wax and fat) indicates something of the nature of the substance, for the substance looks and acts very much like wax and fat. Most people who see a very good specimen for the first time, would be very sure that it contains each of these ingredients.

Adipocere was first distinctly noticed and described about a century ago in France. Since then it has been found and is known to be constantly produced in all parts of the world, excepting perhaps the polar regions. In 1787 there occurred an opportunity of collecting a very large quantity, and the most eminent chemists made a careful examination of it and determined its nature and some of the conditions under which it is formed. At this time, on account of the increase and encroachment of the living population of Paris, it became necessary to dig up and carry away the contents of some of the ancient cemeteries. It had been the custom to bury poor people in pits, thirty feet deep and twenty feet square. Into these pits the bodies placed in cheap boxes were packed as closely as possible without any intervening earth to within a foot of the top: this last foot was soil and the whole of the covering of mother earth which protected the remains of 1200 to 1500 human beings; for that was the number of bodies actually placed in each of these pits.

The first pit that was examined by the chemists Fourcroy and Thouset, had been filled and closed up fifteen years before. On opening some of the coffins, for the wood was quite sound, only tinged of a yellow color, the bodies were found within, shrunk so as to leave a considerable vacant space in the upper part of the coffin, and flattened as if they had been subjected to a strong compression; the linen which covered them adhered firmly, and upon being removed, presented to view only irregular masses of a soft, ductile, grayish white matter, apparently intermediate between fat and wax; the bones were enveloped in this and were found to be very brittle. The bones and the hair were the only parts of the body which were not very much changed. All else, the brain, the heart, the contents of the abdomen, muscles, nerves etc., had disappeared, and in their place was that peculiar, soft, ductile, grayish white substance which the chemists then agreed to call adipocere. The bodies were so much diminished in size and weight, and they had such a consistence, that the grave diggers found it most convenient in carrying on their work to roll them up from head to heels and thus get each one in a compact form for handling.

Adipocere partakes of the nature of wax and fat and may be used in the arts as substitutes for these. In fact it is said that large quantities of the adipocere dug out of the pits of Paris, were used in making soap and candles. To such base uses may we come at last. Great Cæsar dead and turned to waxy fat might make us soap and light and help to grease our hubs.

But all dead bodies do not turn to adipocere. To the experienced Paris grave diggers, it was not a new substance, and they had observed that it was found only in the pits, and consequently it was the fate of poor folks only. Adipocere has

been found in considerable quantity in the potters' field, of New York city, which has been removed to satisfy the necessities of our rapidly increasing population.

There are circumstances however in which a body buried by itself may change into adipocere. Probably all the conditions are not well understood, but it is certain that the change has been brought about in bodies which had been buried in running water.

As might be supposed, the formation of adipocere is not limited to the human body. The fact is that the bodies of very many of the larger animals have been found changed into it, and without doubt the body of an ox or a cat would in like circumstances be changed in the same way as the body of a man. The specimen received from Mr. Northrup, which suggested this article, no doubt originated from the body of a sheep.

As to the chemical nature of adipocere, it may be considered an ammoniacal soap. In the decomposition of the animal substances of the body, the solid fat acids, manganic, stearic, etc., combine with ammonia, to form adipocere, which being a permanent compound remains after all else is dissipated.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, March 21st, Prof. Tillman presiding.

A new portable printing machine was exhibited designed for general use not only for printing of circulars, bill heads, etc., but to be employed by the business man for transacting his correspondence, it being claimed that letters can be printed by its use more quickly they than can be written with pen or pencil. A machine of somewhat similar construction for stereotyping, was then shown. In this machine the letters, figures and some of the most frequently recurring words are arranged on the periphery of a wheel. As in the former machine, the type are operated by a set of keys as in a pianoforte: by pressing down either key the corresponding letter, figure or word is in the one case printed or, in the latter machine, is pressed into the plastic material from which may be cast a stereotype plate, ready for printing. A steam plow having the great recommendation in its favor that the spaders assist rather than retard its progress: and an improved ventilator for chimney tops, were also exhibited and their construction and advantages explained by their inventors.

BRIDGE BUILDING.

Mr. Blanchard read a paper on this subject therein proposing an easy and practical solution of the mathematical question involved, and suggesting a readier way of arriving at the old results and one better adapted to the capacities of mechanics than the formulæ laid down by engineers. He began by considering the whole span from pier to pier to be divided into such a number of shorter spans, that each may be covered with sufficient security by a single length of simple beams. The points of division between these sub-spans may be called "bearing points" and the erection of a structure containing these bearing points is what we call bridge building. As in the consideration of the circle, we make the curve as a polygon of an indefinite number of sides, so in the arch it is necessary to reason from point to point of the curve in straight lines. The bearing points of the bridge can only be supported by oblique supports acting from the ends of the structure and may act by compression, as in the arch, by tension, as in the suspension cables, or a combination of both as in the truss bridge. It is a theorem in statics that when a body is held in equilibrium by three forces acting from different directions, these forces are relatively equal to the three sides of a triangle, each side of which is drawn at right angles to the direction of the force it represents. From this it follows that if a body in equilibrium is acted upon by any number of forces, the relative magnitude of each is represented by the sides of a polygon each side of which, as before, drawn at right angles to the force it represents. By an application of this law the proportions of the timbers or irons that form the supports of the bearing points may be determined by regarding each point as maintained in a state of stability by three or more contending forces that neutralize each other. The weight of the load, a vertical force, is to be resisted by oblique supports acting from different directions. The greater the inclination of the braces the greater the strain, while the more upright they stand the less the strain becomes. By resolving the strain into thrust and weight the strain upon the tie rod at the bottom is obtained; also the strain upon straining beams which it is necessary to introduce between the heads of the braces when more than one is employed.

In a truss bridge the braces near the center of the bridge transfer their strain to those next nearer the ends, which have this strain in addition to their own to carry: this load is then transferred to the next, thus the strain constantly increases by regular additions from the center to the ends of the bridge. The top and bottom cords perform the secondary part of holding the braces in position, the former being the aggregate of all the straining beams placed between the heads of the braces to resist the inward thrust, while the latter is the aggregate of all the rods with which are connected the feet of each pair of braces to prevent the outward thrust. Mr. Blanchard then explained the necessity for using counterbraces when the load is unevenly distributed, illustrating his views with numerous diagrams and models. The able and interesting article by Dr. Stephens, read at this meeting, we shall refer to again at some future time.

A COATING FOR FLOORS, fire-proof, durable and ornamental, might be applied from a strong solution of soluble glass. Water of course could not be allowed to remain on it.

To Silver Glass.

1. Dissolve 10 grains of nitrate of silver in 1 oz. of water. Then add strong ammonia drop by drop till the cloudiness at first produced is cleared up.

2. Dissolve 10 grains of Rochelle salt in 1 oz. of water.

These solutions may be kept apart for any period. For use they are mixed and filtered. After mixture they must be used as soon as possible. The glass must be carefully cleaned; any foreign matter leaves streaks. The glass is placed in a horizontal position and as much of the solution is poured on as it can sustain. Or the solution may be put into an earthen or glass dish and the glass immersed in it. The silvering is completed in half an hour or more.

CAUTIONS.—The operation should be carried on in a room warmed to about 70°. Any vibration of the glass or liquid caused by wagons in the street or machinery in the workshop is fatal to success. If the liquid and glass be exposed to full sunlight the process goes on better. But all the preliminary preparations should be made in a feebler light.

This plan gives only bright silvering. To secure a mat surface seen through the glass silver leaf or paper should be used. A mat surface may be produced on the bright silver by deposition of more silver by the battery; but this will not show itself through the glass.

PROF. WHEATSTONE'S TELEGRAPH is operated by drawing through the sending instrument a strip of paper perforated beforehand with the proper characters of the despatch. The perforations give the connections, and are prepared with an instrument as rapidly as in the usual mode of telegraphing, by any number of assistants which the pressure of business may require, the line being occupied only by the rapid drawing through of the prepared despatches. An ingenious instrument by the same inventor, is used by the Emperor of the French for secret despatches. The words, sent in cypher, of which the sending operator knows nothing, are translated into intelligible print by a proper arrangement of effects in the receiving instrument; and yet the attendant of the latter is as ignorant as the former, for the printed telegram is reeled off into a locked box, as fast as printed, without allowing a letter to be seen.

PUTTING UP FLOWERS FOR WINTER.—Some of our fair friends, when about canning fresh fruits for winter store, may perhaps like to put up a few fresh flowers. We give them a newspaper method for trial. Cut choice buds just ready to open, with a good stem, say three inches long, the end of which is to be immediately covered with sealing wax. Dry the buds partially in the air, and wrap each in a piece of soft paper, clean and dry, and fasten them up in a tight dry box. When wanted, take them at night, cut off the sealed end of the stem, and put them into water containing a little niter or salt. The next day or thereabout, the buds may be expected to expand.

MR. WHITNEY, of Effingham, Ill., whose engraving of a "Coffee Roaster" was recently published in these columns, in acknowledging the receipt of his engravings, model, and patent, adds: "Thanks for the promptness you have exhibited in all your transactions with us. We have sold the state of Indiana, and probably Kentucky, and are now in correspondence with a large number of persons negotiating sales of counties in different parts of the United States. Illustrating and advertising in your paper pays.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

VENT PEG OR VALVE.—Stephen Bourne, Headstone Drive, Harrow, Eng.—This invention relates to a valve or vent peg for beer casks, etc., and consists in making the valve or vent peg of india-rubber and with one or more openings in such a manner that by the elasticity of the rubber or other material they will be held closed while by the extension of the rubber they will be opened and thus a communication established between the inner and outer faces of the valve.

HOOP SKIRT.—August Fellheimer, New York City.—This invention consists in forming loops at each end of the hoops composing the skirt by bending such end over and then securing it to the main portion, by means of which hooploops a reliable and durable connection is established between the hoop and their sliding tubular fastenings or the tapes of the skirt, as the case may be.

LOCK.—E. P. Porter and G. W. Hallett, Waterford, N. Y.—In the lock embraced in this invention a series of spring catches are so arranged with regard to the bolt that when the bolt is out they will interlock with the same and will hold it in such position when releasing said catches from the bolt by a suitable key; the bolt is then free to be drawn in.

AUTOMATIC BOILER FEED.—Henry O. Demarest, New York City.—This invention relates to a boiler feed which consists principally of two chambers which oscillate on a suitable rod, their ends being pared off and ground steam tight against seats which are formed by the end pieces of a suitable frame. Suitable channels in the seats and chambers allow said chambers to fill and discharge alternately each chamber when full being made to descend by its own gravity and in descending it opens the communication with the steam boiler and if the water in the boiler is below the desired level steam is admitted to said chamber and the water contained in it sinks down into the boiler, and while one chamber discharges the other fills and an automatic boiler feed is obtained which when once properly adjusted requires no further attention.

CORN PLANTER.—A. M. Corbet, Bethlehem, Iowa.—This invention consists in a novel manner of constructing and aranging the slides in the seed box which are so made that the flow of seed may be regulated according to the quantity required to be sown. The slides are furthermore provided with slots or perforations in such a manner that the seed may pass from one slide to the other without clogging up; the hole in the lower slide being closed while the seed passes through the scrapers to the ground.

POUNCING HATS AND HAT BODIES.—John L. Labiaux, Newark, N. J.—This invention relates to a machine on which hats and hat bodies of various sizes and shapes may be pounced with the greatest rapidity and ease.

AIR PUMP.—Daniel Carpenter, Peekskill, N. J.—This invention relates to an air pump of novel construction which is to be applied for the purpose of creating a vacuum in boxes or vessels, which are to be used for preserving meat, vegetables or any other article. This invention will prove to be of especial value for long journeys on ships, but also for many other purposes

MANUFACTURING MATCH SPLINTS.—Emry Andrews and William Tucker, Portland, Me.—This invention consists in a rack arranged with slats which are strung on wires with washers interposed between them in such a manner that the match splints can be firmly clamped between the slats and the principal strain is thrown on the wires. The rack is fed down by a compensating feed composed of a feed bar which moved down against the action of springs by means of cams on the driving shaft and which is so constructed that it moves the rack for the thickness of one slat for each stroke of the head which pushes the cards against the knives. The slats of the rack are opened by suitable wedges so that the match splints can readily enter between them. The cards are driven against the knives by a toothed feed plate which drives the splints clear through the knives. Said knives are firmly secured on two screws supporting the ends thereof and they are kept apart by washers interposed between them. A portion of the knives are placed in the rear of the others so that they do not all cut simultaneously and the wood is relived of a part of the compression which it would receive were all the knives in a line. The cutting edges of the knives are concave whereby a drawing cut is produced each way from the center of the card and the knife is less liable to follow the grain of the wood than it is when made with a rectilinear cutting edge.

TOOL HANDLE.—William Runde, New York City.—The object of this invention is to so arrange a tool handle that all kinds of shoemakers' and saddlers' tools may be easily held therein, and that they may be easily removed therefrom and replaced without trouble.

CLOTHESPIN.—William M. Doty, New York City.—The object of this invention is to make a clothespin or fastener in the simplest and least costly manner, and to construct it so as to be strong and easily applied to or removed from a clothesline as may be desired.

IRONING MACHINE.—P. O'Thayne, New York City.—This invention relates to a machine for ironing clothes or articles of any description, said machine being composed chiefly of a movable flat or segmental board in combination with a smoothing iron which is heated by a gas flame and which is so arranged that it can be depressed on the board and that it can be revolved if it should be desirable.

CONVERTING MOTION.—Wm. H. Hurlbut, Elgin, Ill.—This invention consists in the employment or use of a spiral flanged cam in combination with the crosshead of a steam engine, or other equivalent part of another motor and with a shaft to which a revolving motion is to be imparted in such a manner that by the action of the crosshead or other equivalent part on the spiral-flanged cam the reciprocating motion of the piston of a steam engine or the reciprocating motion of an equivalent part of another motor is converted in a continuous rotory motion of the shaft said spiral-flanged cam acting as a substitute for the crank.

DRILLS FOR OIL AND OTHER WELLS.—Washington Tingley, New York City.—The object of this invention is to improve the construction of drills for oil and other wells, so that they will penetrate the rock with ease and rapidity, ream out the bore as the drill advances into the rock, and keep the bore at its full diameter, and also gather within itself the detritus produced by the action of the drill after the manner of a sand plow.

BELTING PULLEY.—Moses Lewis and Samuel Miller, Greenville, Conn.—This invention consists in constructing pulleys upon shafts running at right angles in such a manner that the belt being at a half turn or twist the strain is equal from one belt to the other.

PAINT CAN.—Herman Miller, Hoboken, N. Y.—The object of this invention is to so arrange cans, in which ready made fpaint is kept for sale, that the same may be opened and reclosed with ease, and still be at all times air-tight.

PRESS.—David King, Aberdeen, Ohio.—This invention consists in construct ing a screw press in such a manner that the screw after it has been turned or run down may by turning the lever by means of a rack and pinion, be elevated rapidly thus saving the time of running the screw up and down in the nut.

HOISTING APPARATUS.—George L. and Wm. M. Howland, Topsham, Me.—This invention consists in the use of a third pawl, whereby the notched bar may be raised two or more teeth at a time, which pawl can be easily thrown out of gear to test the device, operate for raising or lowering, and consists also in making the connections between the lower pawls more flexible, by the application of one more link, whereby the operation will be easier and a less amount of power required.

TOOL FOR CUTTING BOILER TUBES.—Peter Hoffman, Jersey City, N. J.—This invention relates to a tool for cutting boiler tubes which is composed of a split or sectional bar, one end of which is made to fit the tube to be cut, while its other end, which carries the cutter, is open to receive a wedge in such a manner that when the cutter bar is inserted in the tube to be cut and the wedge is placed in its slotted end, the points or teeth of the cutter catch in the inner surface of the tube and by turning the wedge and cutter bar and driving said wedge in gradually, the tube is cut in a short time and without producing the least jar in the joints of the boiler.

WAGON BRAKE.—B. B. Scofield, Woodhull, Ill.—This invention furnishes an improved brake for wagons, carriages, etc., simple in construction and effective in operation.

WIRE POINTING.—John Lockwood, Wilton, Conn.—This invention consists of a simple and convenient machine for pointing wire for drawing.

LOCKS.—Chas. Geschwine, and Chas. Reichard, Union Hill, N. J.—The object of this invention is to arrange a lock in such a manner that it cannot be unlocked, unless the position of the key is reversed. The invention consists in so constructing the spring catch and the bolt, and combining them with a dog, or pawl that the bolt cannot be unlocked, unless it is first pressed back by the dog. The latter can in turn only be operated by placing the spindle of the key into the lower end of the key hole, while for locking and unlocking the spindle is pressed through the upper end of the key hole.

FIRE ARM.—Thomas Restell, London, England.—This invention relates to certain improvements in breech-loading needle guns which are so constructed that they serve also as canes and which are operated in an easy and simple manner.

LOCK.—L. S. Chase, New York City.—This invention relates to a lock in which the bit of the key acts on a series of pins or spring stops which are inserted in a revolving disk and which correspond in number and position to a similar number of pins inserted in suitable cavities in the lock plate. Said revolving disk is provided with a circular ward which extends clear up to the inner lock plate and prevents the feeling of the lock, and a bridge in this ward protects a portion of the tumblers and pins. The bit of the key acts on the tumblers but the bolt is thrown by a nose projecting from the circumference of the velocity disk.

HOT BLAST FOR FURNACE.—Job Froggett, Youngstown, Ohio.—This invention consists in a novel arrangement for heating the air which is forced into furnaces for smelting and other purposes.

CHURN.—Daniel C. Merrill, South Paris, Maine.—This invention consists principally in the construction of the dasher, in making the horizontal arm of the standard adjustable, so that it may be extended or contracted to accommodate different sized churns; in combining an adjustable slide or socket with the balance wheel for the reception of the end of the adjustable sliding arm attached to the dasher handle.

DRESS IMPROVER.—John Stademann and Henry Sanerbier, New York City.—This invention relates to a device to be applied to male and female garments for the purpose of giving it fullness. It is more especially designed for giving fullness to the chest of male wearers and to supersede the use of padding in the upper part of the fronts of vests and also to give prominence to the waists of ladies' dresses in front of the breasts. This result is attained by having the swaged wire cloth or wire gauze divided into two parts and connected when necessary by hooks and eyes, slides or elastics, so that they may be attached to or inserted in the garment.

METER ATTACHMENT.—Isaac P. Tice, New York City.—This invention consists in applying a plurality of meters to a still in such a manner that the amount of low grade spirits, or that which requires to be re-distilled, and has passed through the still, will be made known or indicated to a government official or detective, so that the government cannot be defrauded of revenue by an inaccurate statement of the amount of low spirits, or that below proof, produced by any distillation or series of distillations.

WAGON.—Benjamin Ryder, *Jr.*, South Orrington, Me.—The object of this invention is to obviate the necessity of employing so many wagons for the various purposes of the farm and road, and it consists in adapting one wagon by a proper arrangement of parts to all or nearly all the various uses for which a common wagon is required.

PEAT MACHINE.—Thomas J. Wells, St. Anthony, Minn.—This invention relates to a new and improved machine for grinding peat and pressing it into molds, so that it may be used for fuel. The invention consists of two rotary conical grinders, one revolving at a greater speed than the other, and placed within a suitable case, and also in reciprocating molds arranged with the discharge end of the case of the grinders, and provided with plungers.

STEAMBOATS FOR PROTECTION AGAINST FIRE.—Abraham. G. Polhamous, Nyack, N. Y.—This invention relates to an improvement in the construction of steamboats to protect them against danger of fire, and consists in the construction of an iron tank or reservoir of water, as a foundation for the boilers and furnaces.

DETACHING BOATS FROM DAVITS.—Johann A. Libberiz, Hamburg, Germany.—This invention relates to a means for detaching boats from davits, and of that class which admit of both ends of a boat, being detached simultaneously by the manipulation of a single lever by one person. The object of the invention is to obtain a simple, efficient and economical device for the purpose, and one which may be operated with the greatest facility.

HAND POWER LOOM.—Dean, Bolding & Perry, Wassonville, Ohio.—This invention consists in so constructing and arranging the mechanism of a hand power loom that the operation of the treadles, and the consequent shifting of the harness, the necessary motions of the picker staffs to insure the effective throw of the shuttle shall be governed by the action of the batten, and be at all times under the full control of the weaver.

SPRING FOR VEHICLES.—J. B. Stuart, Bunker Hill, Ill.—This invention relates to a spring for carriages and other wheel vehicles. The object of the invention is to obtain an axle spring which will be strong and durable, possess a requisite degree of elasticity, and still hold the body of the vehicle firmly so as to prevent all side surging and a backward and forward play or movement, and render unnecessary the use of a perch or reach with its accompanying braces.

HEMP BRAKE.—Simeon Sherman, Weston, Mo.—The hemp is passed between breaking rollers, and thence is carried forward by and between endless carriers where it is exposed to the breaking and loosening action of oscillating beaters above and below whose teeth strike it in concert between the intervals of the bars of the carrier.

STEAM GANG PLOW.—W. H. H. Heydrick, Chestnut Hill, Pa.—The invention consists of an arrangement of devices by which the plows are caused serially to enter the ground on a given line at right angles to the course of the machine, and to be withdrawn in a similar manner, so that although they are arranged in a receding series obliquely to the line of motion, they shall begin their furrows and terminate in a line at right angles to the course of the machine.

SECURING TEETH TO THE SICKLE BARS OF HARVESTERS.—C. S. Williamson, Covert, N. Y.—This invention has for its object the attaching of teeth to the sickle bars of harvesters, in such a manner that they may be readily detached when necessary, for the purpose of being ground or to have new ones applied, and also readily attached to the sickle bar.

HOISTING AND CANTING.—James Tracy, Brewer's Village, Me.—This invention relates to improvements in machinery to be connected with a gang saw mill for canting and hoisting the timber after it has been cut into plank upon the table of a circular saw for edging the plank. This operation is usually performed by hand by several men with great labor, whereas by the application of my improved machinery the manual labor is saved and the operation is performed with great dispatch.

FLOUR AND GRAIN ELEVATOR.—Henry Stanley, St. Johnsbury, Vt.—This invention consists in an improved mode of constructing a reservoir or air chamber for cooling flour or grain by exposure to atmospheric air.

HOOP SKIRT.—Louis Fellheimer, New York City.—The object of this invention is to provide a hoop skirt which will overcome the objection heretofore experienced by ladies on entering and leaving carriages from the entanglement of their feet in the skirts. Another object is to provide a hoop skirt which will fit either stout or slender females.

HARROW.—Caleb Bates, Kingston, Mass.—This invention relates to a harrow of that class which are arranged with a revolving toothed portion, and are commonly termed revolving harrows. The invention consists in the application of swinging blades to the revolving portion or portions, whereby said portions are made to rotate under the draught movement of the implement. This invention also consists in constructing two revolving portions in such a manner that they may be made to gear into each other like toothed wheels, so as to insure a simultaneous movement or rotation of both portions.

THRIBBLE SWITCH FOR RAILROADS.—James Tillinghast, Buffalo, N. Y.—The object of this invention is to avoid accidents by a wrong adjustment of the switch—a contingency of not unfrequent occurrence, especially in those cases whereby thribble switches are employed.

SAFETY ATTACHMENT FOR POCKET BOOKS.—Simon B. Parker, New York City.—This invention relates to pocket books, whereby the same cannot be illegitimately abstracted from the pocket.

ADJUSTABLE RUNNERS FOR CHAIRS, CAMP STOOLS, ETC.—W. H. Stroup, Pittsburg, Pa.—This invention has for its object to furnish a runner, so constructed and arranged that it may be attached to chairs, camp stools, etc., to adapt them for use as sleds on skating ponds, and from which they may be removed without injury to the legs of said chairs or stools.

RIDING SADDLE.—Samuel S. Spurgin, Jacksonville, Ill.—The elastic membrane which is strained between the pommel and cantle and supports the seat, is fastened to and upon the springs whose ends rest upon the side plates.

HANDLING GRAIN.—Fayette Clark, Marcellus, N. Y.—This invention consists of a scoop having a handle at each end, and is intended to facilitate and expedite the handling of grain.

HAY LOADING WAGON.—Eli Sweet, Whitney's Point, N. Y.—This invention relates to new and improved devices to be attached to wagons for loading hay or fodder in the field or barn, and consists in the combination of a crane and single pulley rope with a pitchfork and a sliding tongue in connection with a brake on the forewheels, in such manner that by the sliding of the tongue, when it is tripped, the horses hoist the fork with the hay and at the same time chock the wagon by the action of the brake, the whole draft being very light and the operation convenient.

CRUSHING AND PULVERIZING CLODS OF EARTH.—John Custer, Corsica, Ohio.—This invention relates to improvements in a machine for crushing and pulverizing clods of earth after the ground has been plowed.

FLOUR SIFTER.—James A. Sinclair, Woodsfield, Ohio.—This invention has for its object to furnish an improved machine for sifting flour meal, or screening grapes, cherries, berries, etc.

STOVE-PIPE DAMPER.—Thomas K. Anderson, Hornellsville, N. Y.—This invention consists in an improved self-adjusting stove pipe damper so constructed and arranged that the draft of the stove shall regulate the damper so as to maintain a uniform fire.

METER AND SEPARATOR.—Isaac P. Tice, New York, City.—The object of this invention is to obtain a simple and efficient device by which the amount of whiskey produced in a distillery may be ascertained by government officials with positive accuracy. It is well known that a large amount of whiskey is distilled in the United States for which the government receives no returns in the way of revenue tax, and this invention will effectually prevent that fraud being practiced. The successful operation of a device for this purpose must possess three essential requisites:—First, A positive or sealed connection of the worm with the meter. Second, An accurate measuring or weighing mechanism with an indicator or register connected therewith accessible only to the government inspector or official. Third, A separater by which the high spirits or that above a certain grade which does not require to be run through the still a second time may be separated from the low grade which requires a second distillation.

METER AND SEPARATOR.—Isaac P. Tice, New York City.—This invention relates to a spirit Meter and Separator designed for use in distilleries for the purpose of enabling government officials to ascertain with positive accuracy the amount of whiskey or other spirits distilled therein, and at the same time effect a separation of the "proof" from the low grade spirits, as revenue is rated and paid on "proof" spirits or that having a grade of 50° by hydrometer. The object of the invention is to prevent the stupendous frauds now perpetrated on the part of a large number of distillers against the government, false returns being rendered on the amount of spirits distilled.

WINDOW SASH FASTENER.—Orville M. Ridgway, La Porte, Ind.—This invention consists in the combination of a metallic spring and rubber block, with the opposite edges of the window sash for the purpose of holding it securely at any point to which it may be raised.

CORN CULTIVATOR.—H. P. Kynett, Bisbow, Iowa.—This invention relates to an improved construction of a cultivator for Indian corn to work with a double beam on both sides of a row of corn at the same time.

OBTAINING GREATER HEAT FROM PERMANENT INFLAMMABLE GASES.—Simon Stephens.—For this purpose, these gases are mixed with steam before reaching the burners, which increases the volume of the flame, so as to cause it to fill the spaces where the heat is to be applied. The steam may either be passed into the gas pips, or may be used to cause an increased draft of air to act on the flame; and the mixture of gas and steam may be used in conjunction with ordinary solid fuel. The inventor applies the flame so obtained to the production of a lime light, etc.

THE SOLUTION AND TREATMENT OF VARIOUS GUMS, RESINS, ETC.—Edmund Hunt.—This object is obtained by the use of some acid or alkaline substance which is an oleaginous fluid at any temperature below 900° Fah. Oleic acid, carbolic acid, etc., answer for solvents; but the selection must be determined by the cost. Waste pieces of vulcanized india-rubber may be utilized by this means; also ebonite, etc. The gum, etc., should be reduced to small particles before being subjected to the action of the solvent. Heat and agitation are applied to hasten solution, and the solvent should be saturated. Different gums require different treatment.

PRESERVATION OF ANIMAL SUBSTANCES.—Henry Medlock and William Bailey.—This is effected by dissolving ordinary commercial gelatin in boiling water, in the proportion of two pounds of the former to ten of the latter; then adding to the solution of gelatin an equal volume of a solution of bisulphite of lime, having a specific gravity of about 1070. While the mixture is still warm, the meat, poultry, etc., which is to be preserved, is dipped in, or brushed over with it two or three times. When the mixture of gelatin and bisulphate has solidified on the surface, the animal substance is to be packed as air tight as possible; and if it is to be transported to a considerable distance, the interior of the box, etc., containing it should be brushed over with the mixed solution. To preserve hides, it is necessary only to coat their inner surface with the mixture. When animals are treated in this way, the viscera and blood must be removed, and their interiors also coated with the mixture. The latter may be removed by soaking in water.

REFINING PARAFFINE WAX.—J. Leach, St. James' street, Hatcham. Dated 23rd July, 1866.—This invention consists in the more speedy, effectual, and economical method of treating crude paraffine, so as to render it white, hard, and more suitable for the purposes for which it is employed. The process adopted is, First, to boil the crude paraffine for about two hours, more or less, with a solution of caustic alkali, which has the effect of precipitating the oil with which the paraffine is combined. The precipitated oil is then removed by washing. The paraffine is then submitted to the action of animal charcoal, after which it is filtered and pressed. It is then re-melted, washed, and again subjected to the purifying power of charcoal, after which it is again filtered and treated with about five per cent of naphtha and pressed. To remove more completely any impurity that may still exist, it is re-melted, washed, treated with charcoal, and filtered.

TANNING OF HIDES AND SKINS.—G. Mountford, Grasscroft, Yorkshire, and G. L. Loverside, Manchester. Dated 23rd June, 1866.—This invention relates to an improved method of tanning by the employment of valonia and oak bark, in conjunction with American pearl ashes, and which, as is well understood, consists essentially of carbonate of potash, whereby a considerable diminution of the time required for the process of tanning is effected, and a leather or tanned hide or skin of a superior equality is obtained. In cases where it is advisable to give a yellowish color to the leather, turmeric may be used with the valonia or valonia and oak bark.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

A. G., of Wis.—Aluminium may be deposited by the battery from a fused mixture of anhydrous chlorides of aluminium and sodium. We consider it doubtful if aluminium has ever been deposited by the battery from an aqueous solution. There has been an abundance of rubbish printed on the subject.

J. S. P., of Pa.—Black band ore, especially that containing two or more per cent of free carbon may be smelted profitably in small furnaces. The tan blast is not recommended for smelting furnaces. The fan does not give economically over one lb. pressure, while in iron smelting upwards of two lbs. pressure is desirable. We know of nothing better than the blast furnace process.

A. S. M., of O.—The ordinary working effective pressure in the Ericcson and other air engines we understand to be 5 to 6 lbs.

H. H. W., of Mass., wants to know the best way of extinguishing a lamp, as he is warned against blowing down the chimney. Our practice has been to turn the wick down until the flame is feeble and then blow down the chimney.

N. G. T., of N. Y.—"Will the pressure on a slide valve be increased by enlarging the ports, the pressure in the steam chest remaining the same." Certainly, why not?"

C. D. M., of Pa.—Any salt of copper introduced into a flame will give it a green color. The green color of fire works is due to sulphide and other preparations of copper. The best way of producing monochromatic light for indoor exhibitions is to surround the flame with colored glass. At the theatres the lime light and colored glasses, have superseded the old fashioned pyrotechnic compounds.

A. S., of Mo.—There is no electric light which can yet compete with the lime light, for use with a traveling stereoptican exhibition. If a battery be used as a source of the electricity 25 to 30 of Grove's cups would be needed; and a sufficiently powerful magneto electric machine would weigh tons, and the strength of more than one man to operate it. Yet we have little doubt that electric light will some day come into fashion and be cheap enough. As long as we know that light represents or is equivalent to a very small amount of electricity or mechanical force we cannot give up the hope that we shall learn how to manufacture our light with as little labor and trouble as we now grind coffee.

G. W. S., of Pa.—"What mineral if any is contained in the enclosed sample of rock?" The sample of rock weighs about ten grains and is mainly sulphide of zinc. Such ore is often called by miners "black jack" and is one of the important sources of zinc.

H. C., of N. Y.—The sample of "stuff" which you say was taken from what was represented as a bed of sulphuret of silver, is sulphide of iron. Did you think it was gold?

J. D., of Idaho, informs us that the cultivation of beets for sugar is engaging much attention just now in the Pacific States.

J. E., of Pa.—We do not think there is any material which can be long used in the solid form as a float in a steam boiler. Wood is ordinarily considered to be lighter than water. But its apparent lightness is due to its porosity. When wood is for a long time kept under water air escapes out of its pores and it sinks. Hollow floats are commonly made of copper. What is the objection to them?

D. G. S., of Pa.—You will find coal tar and coal tar asphaltum a good covering for your wire ropes, and they are not corrosive to iron. The "sulphur water," of coal mines is always acid and unprotected wire rope coming in contact with it is soon used up. There is probably no cheaper protective coating than some sort of tar.

E. R., of Vt.—"When a sugar maple is tapped does the sap come from above or from the roots." The water of sap for the most part enters, at the roots and travels upward, on its way up; in the trunk and branches of the tree the saccharine matter is formed. When the tree is tapped the sap flows down by gravity. Below the tap there is very little saccharine matter.

D. R. M., of Pa.—You ask whether it will be cheaper to use one boiler, 20 feet by 5 feet, to run an engine 14 by 20 inches, rather than two of those dimensions, the pressure of steam on the two being 30 pounds and the velocity of your engine 70 revolutions. You omit to give us the character of your boilers, whether cylinder or flue, the amount of heating and grate surface, and the point of cut-off, if any, of your engine. So we can only reply that if you can make steam enough without unduly forcing the fire, one boiler ought to run your engine with less fuel than two. Certainly if the boilers are at all what boilers should be, one should be sufficient for your engine.

R. F., of Ill.—We cannot understand your reasons for considering a cylinder of boiler iron 82 inches in diameter less able to withstand a certain pressure per square inch than one of the same grade of iron 72 inches diameter; for these are exactly the facts in the boiler to which you refer. After very careful examination of upright boilers built on the Densmore plan, we cannot conscientiously consider them as inferior in strength, from anything in their peculiarities of construction, to any other cylinder boilers. By tests which have been made it has been proved that the inner tube cylinder you suppose to be a weak part, is stronger than other portions. We consider it safe, and believe the accident you refer to is attributable to other causes rather than defects in the plan or construction.

T. S. C., of Ohio.—We have examined your diagrams and are reluctantly forced, to give an opinion against your projects. You expect to gain power by attaching an eccentric to your crank-pin and thus increase the radius of the crank motion. It is a pretty theory, but you will gain nothing from it in practice but friction. You say you can gain 20 per cent of power—or "the utilization of power will be 20 per cent—and increased friction only 5 per cent, a handsome advantage of 15 per cent." If this is so, why not increase the throw of the eccentric and make a gain of 100 per cent? Please look into this matter more carefully and closely. . . . Your plan of using steam expansively is not new and in its arrangement of the two cylinders is really absurd. A similar plan, but more correct, is now in successful operation. We preserve your diagrams subject to your order. Do not get discouraged at one failure.

T. P. K.—Your combination of gearing for driving rolls is good. The power of the engine you describe as of 6 inch bore, 18 inch-stroke, 90 revolutions, and 60 pounds pressure is 13.93 horse-power. The power exerted on the rolls is that, less the intervening friction. The weight that could be raised by a rope passing around or between the rolls would be as much greater than the power directly by the engine as the surface of the rolls move slower than the periphery of the driving pulley on the engine shaft, less the friction. As much greater the weight you could thus raise than that raised by the engine direct would correspond to the velocity. There is no actual gain in power but a loss by friction. From these remarks and your data you can easily calculate the results.

J. H., of N. J., sends a copy by photography of a scientific document. But the copy is greatly reduced in size from the original, and is not legible to the unassisted eye, and under the microscope is quite indistinct. We shall be pleased to consider the subject if he will send us a paper which we can read.

T. E. L., of N. Y.—You can grind and polish the speculum of a telescope as you would any other disk of hard metal by chucking it in a lathe and grinding with emery and oil, polishing with flour of emery, crocus, and rouge. Care must must be taken not to scratch it.

J. W. G., of Pa.—Crocus or Colcothar—sesqui-oxide of iron—is used for polishing metals and glass. It is the oxide of iron remaining after the distillation of the acid from sulphate of iron.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Dayton, Allen & Co., Richmond, Va., want machinery, with cost of manufacturing 40-gallon liquor casks.

The address of A. S. Munger is Ansonia, Conn.

Wire and Nail Manufacturers are requested to send their addresses to Willis Weaver, Salem, Ohio.

G. D. Humphrey, Emporia, Kansas, wishes to correspond with manufacturers of wind mills or wind powers.

J. Shelon, Newport, Ky., enquires where he can obtain a gage to show the heat of the blast after it leaves the hot blast.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

228.—MACHINE FOR PULLING FLAX, ETC.—Samuel W. Tyler, Troy, N. Y. Jan. 28, 1867.

261.—MODE OF ATTACHING TEETH TO SAWS.—Warren P. Miller, San Francisco, Cal. Feb. 7, 1867.

279.—PRESERVING ANIMAL MATTERS WITHOUT LOSS OF FLAVOR.—Lewis H. Spear, Braintree, Vt. Feb. 10, 1867.

285.—TREATING VEGETABLE SUBSTANCES IN THE MANUFACTURE OF PAPER PULP AND FIBERS.—Benj. C. Tilghman, Philadelphia, Pa. Feb. 11, 1867.

408.—MACHINERY FOR MOLDING AND PRESSING BRICK.—Emery R. Gard, Chicago, Ill. Feb. 18, 1867.

405.—MACHINERY FOR CLEANING WHEAT, ETC.—Samuel D. Mack, New York City. Feb. 13, 1867.

462.—APPARATUS FOR LETTING ON AND SHUTTING OFF GAS, AND IGNITING THE SAME.—Edwin E. Bean and Wm. H. Mumber, Boston, Mass. Feb. 20, 1867.

464.—BOAT DETACHING APPARATUS.—Gideon B. Massey, New York City. Feb. 20, 1867.

465.—FILES AND HANDLES.—Alfred Weed, Boston, Mass. Feb. 20, 1867.

254.—WRITING PAPER.—Joseph E. Hover, Philadelphia, Pa. Jan. 30, 1867.

286.—ATMOSPHERIC PLATES OF ARTIFICIAL TEETH.—Nehemiah T. Folsom, Laconia, N. H. Feb. 1, 1867.

292.—STEAM GENERATOR.—Eli Thayer, Worcester, Mass., Sabin P. Pond, Providence, R. I., and Daniel B. Pond, Woonsocket, R. I. Feb. 2, 1867.

296.—SELF-OILING SPINDLES FOR SPINNING, DOUBLING, AND WINDING FRAMES.—Francis Babbeth, Ilion, N. Y., and John E. Atwood, Willimantic, Conn. Feb. 2, 1867.

302.—MACHINE FOR MAKING MACHINE KNITTING NEEDLES AND OTHER NEEDLES.—Chas. P. S. Wardwell, Gilford, N. H. Feb. 2, 1867.

316.—WEAVERS' HARNESS.—Cullen Whipple, Cranston, R. I. Feb. 4, 1867.

334.—APPARATUS FOR DRYING YARN.—Hugh Whitehill, Newburgh, N. Y. Feb. 5, 1867.

336.—BOBBINS IN SPINNING MACHINERY.—Metallic Bobbin Company, New York City. Feb. 6, 1867.

352.—MECHANICAL MOVEMENTS TO BE APPLIED TO AUTOMATON TOYS AND HOBBY HORSES.—Wm. F. Goodwin, Washington, D. C., and Henry S. Cohn, New York City. Feb. 7, 1867.

430.—WATER METER.—Robert Westcott and Job S. Crane, Elizabeth, N. J. Feb. 15, 1867.

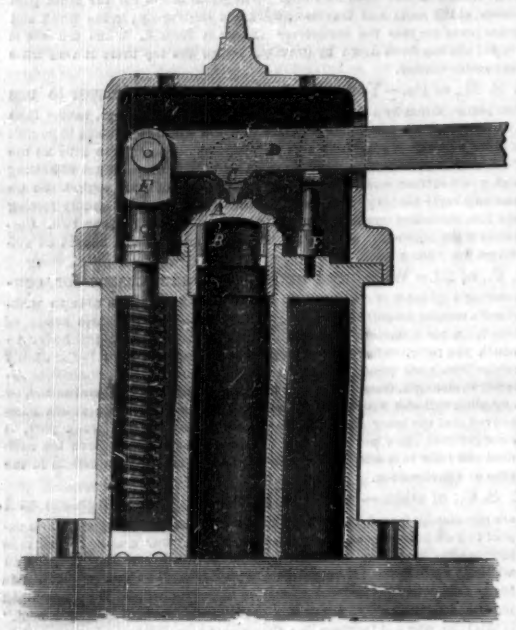
433.—RAILROAD SWITCH INDICATOR.—Thos. S. Hall, Stamford, Conn. Feb. 19, 1867.

500.—GENERATING HEAT BY THE ADMIXTURE AND COMBUSTION OF A HYDRO-CARBON VAPOR, AIR, AND THE GASEOUS COMPONENTS OF SUGAR.—Henry R. Foote, Boston, Mass. Feb. 25, 1867.

502.—SELF-LUBRICATING AXLE FOR CARRIAGES AND OTHER VEHICLES.—Silas S. Putnam, Dorchester, Mass. March 2, 1867.

SWANN'S SAFETY VALVE.

Some safety valves are misnomers; they are anything but safe. The engraving, however, represents one which, it is claimed, cannot become dangerous by the overloading of the lever. The view is a vertical section. It shows the main peculiarity of this valve in the use of a yielding instead of a



rigid fulcrum at the end of the lever. A is the valve, which is a hollow cylinder closed at the top end by a cap forming a part of the casting. This fits loosely into the cylindrical space, B, and is held down by the pivot, C, on the lever, D. Holes are bored in the sides of the cylindrical valve for the escape of the steam when the valve is lifted from its seat.

The stud, E, has guides on its sides which hold the lever, D, in position, so that the point, C, will always be over the center of the valve. The fulcrum, F, is ordinarily held in position by the tension of the spiral spring, but if additional weight beyond that calculated for the pressure desired, is hung upon the lever, D, it will bring the lever to bear upon the stud, E, thus changing the lever from one of the third class where the power is applied between the fulcrum and the weight, to one of the first class where the fulcrum is between the power and the weight. Consequently, the addition of weight to the end of the lever disturbs the relations of the lever and the fulcrum, F, and by the yielding of the spring on F compels the opening of the valve and the consequent escape of steam. Therefore, no overloading of the valve lever will produce the result desired, and tampering in this way with the safety valve is impossible. The tension of the spring on the shank of the fulcrum, F, must be regulated by the pressure of steam per inch on the boiler, and this can be determined by a nut, not shown, on the end of the shank.

At the end of the lever is a wire, not shown in the engraving, which passes through a packed gland on the boiler and has at the other end a float. If the water gets low the float suspended from the end of the lever by the wire becomes an additional weight and acts precisely as a weight placed on the end of the lever, thus becoming a low-water alarm by blowing off the steam. The whole valve is inclosed by a cylindrical case covered by a cap having perforations for the escape of the steam.

This valve is the invention of J. R. Swann, of Edinburgh, Scotland. One of them may be seen at No. 254 Broadway. For particulars address Walter Anderson, corner of Franklin and Elm streets, New York City, or Messrs. Teschemacher & Stearns, 43 Exchange street, Boston, Mass.

Artificial Atmosphere.

M. Galibert's device for supplying an insulated atmosphere of pure air for breathing in the presence of deadly or suffocating vapors, smoke, etc., meets with high approbation in France and England. It is a very simple matter, the only difficulty being to obtain a material for an air-holder impenetrable to gases. This is made by gluing together two very strong linen and hemp cloths, each coated with eight layers of india-rubber varnish. Reservoirs of this material measuring 80 litres, or about 488 cubic inches, are strapped on a man's back and connected with the mouth by two tubes, one for inhalation and the other for expiration, valved, we presume, in such a manner as to allow the passage of air only in the proper direction in each. The nostrils are closed by compression from an elastic clip, and the eyes are protected by goggles fitted air-tight. Thus armed, the fireman has no fear of smoke, nor the miner or worker among chemicals, of foul gases. Several reservoirs can be carried in reserve. Bags of a larger size are also inserted in gas mains and inflated with compressed air, to serve as stoppers when required for mechanical operations.

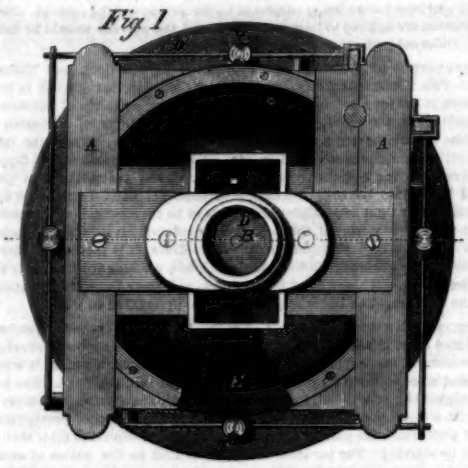
Fine Calf Leather.

Mr. Robert Schwabe, the celebrated leather manufacturer, whose patent and other calf-skins are among the standard brands, states in the *Gerber Zeitung*:—"I employ no secret arts to make my hides tender, but use only water. I use a fulling machine for leather similar to that used in fulling cloth. After heating my upper leather hides in this a second time, they are so tender that they can be put in lime without being stretched; after from sixteen to twenty days' liming, the unhaired and shaved hides are again handled, and by this operation they are so thoroughly cleared of lime, that it is unnecessary to slick them, and they need to be rubbed down only to clear off the hair. Immediately after this I handle them a third time, and this time in water, so it may be regarded rather as a washing. Although my upper leather has been handled for the fourth time, and sometimes the fifth in warm water after the stuffing, yet after another smearing, I obtain a thick, pliable, but not loose leather in the side and neck. I am of the opinion that frequent handling is very effective in producing good upper leather, and I doubt whether an equally good result can be gained by any shorter process. I put the clean leather into a fresh liquor set in motion by means of a reel. It remains here three days, four in the second liquor, and eight in the third, where it is not stirred. By this process the ordinary disadvantages of handling are avoided, and a thick firm leather is gained.

REYNOLDS' IMPROVED BRAN DUSTER.

We give herewith four engravings—sectional—showing an improved bran duster and bolt for flour mills, patented

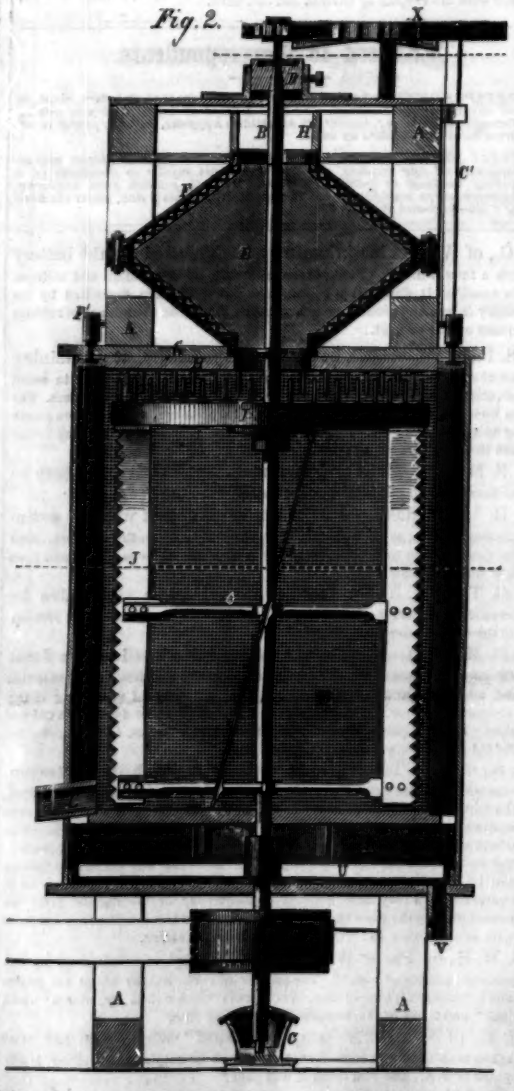
Fig 1



through the Scientific American Patent Agency Nov. 20, 1866. A reference by letters to the parts, with a synopsis of the specifications, will enable practical millers to understand its construction and operation.

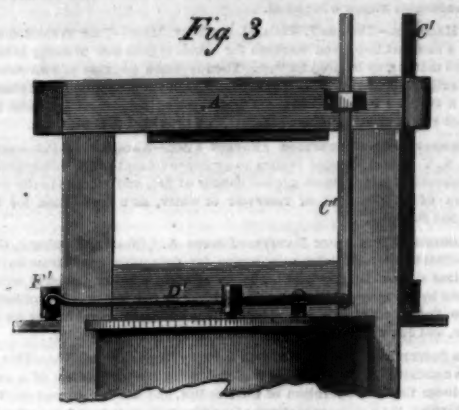
A is the frame of the machine and B the driving shaft, which is vertical and is supported by the step, C, which is cup-shaped and covered to keep out dust. The upper end of the shaft revolves in a bearing, D, which holds a box that is bored to fit the tapering end of the shaft and is secured in place by a set screw. Attached to the shaft, B, is a cone, E, which may be

Fig. 2.



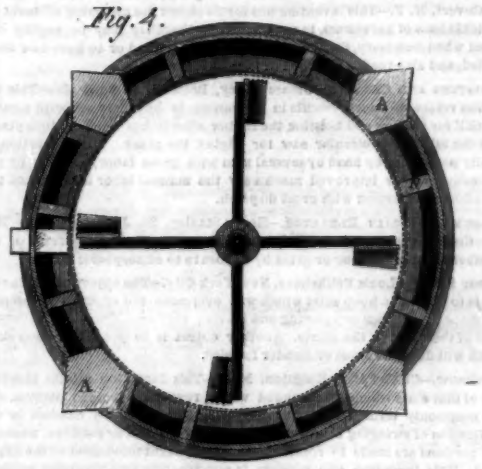
either single or double—in the engraving, Fig. 2, double. Ribs, toothed or notched, as in Figs. 1 and 2, surround the cone and traverse between similar notches on the inner surface of a corresponding fixed matrix cone, F. To the lower side of the platform, G, is attached a fixed head, H, the lower surface of which has downward projecting spikes—see Fig. 2. These are met in their interstices by similar spikes on the upper side of the head, I, which is secured to the shaft B.

Fig 3



There is an annular space all around this head to permit the bran to escape from the cone into the bolt. To the circumference of the head, I, and to radial arms secured to the shaft, B, are secured wings, J, the outer edges being notched and the position of the wings being inclined, as seen in the central one, Fig. 2, so as to uplift the bran while they rotate. L is the delivery spout for the bran. M is a wire bolt cloth secured to a framework of uprights, N, Fig. 4, and to circular heads at the top and bottom. The flour escapes through passages into the receptacle, R, and out of the spout, V, its delivery through the spout being hastened by the arms, U, on the lower end of the shaft, B. The wheel, X, at the upper part of the machine has cams on its lower surface which actuate the uprights, C', and these move levers, D', furnished with weights, F'. These levers and weights engage with pins, which pass through the platform, G, and give a jarring motion to the bolt to keep its meshes clear. The details of this arrangement are seen in Fig. 3. The bran is intro-

Fig. 4.



duced into the hopper, H', and a shaker may be attached to prevent the ingress of nails, cobs, etc.

The inventor says that the use of this improved duster saves from seven to eight pounds of good flour per barrel and gives the best of satisfaction. It is manufactured and sold by I. G. Reynolds & Son, Peoria, Ill., whom address for business particulars.

Limits to the Perception of Sonorous and Luminous Waves.

Almost every one knows that low tones are produced by slow and high tones by rapid vibrations; the limits of perceiving them differ in different individuals: some persons cannot distinguish a tone of less than 30 or 24 vibrations in a second, others of less than 16; very high tones produced by about 10,000 vibrations are not perceived at all by some individuals. A similar peculiarity exists about the perception of light, but in much narrower limits: 450 billion vibrations per second produce red light; 510, orange; 570, yellow; 630, green; 690, blue; 760, indigo; 830, violet, and 900 (the double of 450) a very dark almost invisible violet. Vibrations of less than 450 billions, or more than 900 billions, per second, are invisible to the human eye. The first rays prove their existence by the production of heat, the last by their chemical action on photographic preparations. As our delicate optic nerve in the eye (the retina) would be injured by the admission of heating or chemical acting rays, the transparent liquids in our eyes have been made opaque for these kinds of rays, thus protecting the true organ of visual perception, the retina. This explains at the same time how a light which is darkness to us, may be perceived by some animals with eyes of a different construction. V.

GRAND INTERNATIONAL LECTURE HALL.—The various subjects of the Paris Exposition are to be explained in lectures, illustrated with specimens or pictures, in a commodious hall which is being prepared for the purpose. Historical, technical, scientific and patriotic lectures from competent persons, will be provided, and inventors and exhibitors will also have opportunities for publicly exhibiting and explaining objects of importance in which they are interested, as well as for making commercial arrangements privately. The lectures, completed by supplimentary matter such as may be needed, will be printed and published finally as a record of the progress brought to light in the Exposition.

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VOL. XVI., No. 15....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, APRIL 13, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Baking Attachment for Harvesters	229	Gleanings from the Polytechnic Association	234
*Improved Car Truck	229	To Silver Glass	234
The Aniline Dyes	229	Recent American and Foreign Patents	234
Monkeys in the Cotton Fields	229	Inventions Patented in England by Americans	235
The British Postal System	230	Answers to Correspondents	235
Heliography, or Sun Engraving	230	*Swann's Safety Valve	236
Our Cast Car Wheels	230	Artificial Atmosphere	236
How to Buy Meat	230	Fine Calf Leather	236
Editorial Summary	231	*Reynolds' Improved Bran Duster	236
Incineration or Burial	232	Limits to the Perception of Sonorous and Luminous Waves	236
*Seeman & Catron's Folding Clothes Horse	233	Centrifugal Force	237
The Steam Indicator—Its Value and Use	233	The Care and Use of Files	237
*The Unit of Heat—Mr. Morley's Fallacy	232	Inventors' Institute	237
Our Iron Clad Navy	232	City Pavements	237
Boiler Explosions	233	The Patent Bill Passed	237
Treatment of Steel in Hardening	233	The Day Line	237
Breakage of Chimneys	233	British Art Schools	237
Where the Day Begins	233	Patent Claims	238, 239, 240, 241
Yellow Yain	233	*Improved Spring Bed Bottom	244
Terrific Explosion of a Spoonful of Water	233	The Alexandra Palace	244
Adipocere	233	*Badger's Improved Nutmeg Grater	244

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK Row, and not at No 39.

CENTRIFUGAL FORCE.

There is a power, generated by the revolutions of bodies, known in mechanics as centrifugal force, which is one of the most important products of mechanical movements. In regard to its action we think considerable misapprehension exists. In reply to a correspondent, a short time since, we incidently mentioned the fact that belts running on pulley faces were subject to this influence, and we did not limit the statement by any proviso as to the velocity of the periphery. To this statement we have received several replies, two of which we noticed in No. 13. We think that each of these correspondents assume, either in so many words or by implication, that centrifugal power can only be developed at some certain velocity of rotation. We cannot assent to this opinion, believing that all rotating bodies develope this power in some degree, however slow the velocity of their surfaces. When the revolving motion is so rapid as to entirely overcome the action of gravitation—called for convenience, when exerted on a revolving body, centripetal force—the action of the centrifugal force becomes evident to our senses; as when the water is thrown from the surface of a swiftly revolving grindstone, or the sand is projected from the tire of a carriage wheel. But we have no right to assume that the slow moving grindstone or the sluggish cart wheel does not develope this power because we do not see its results.

The idea that the tendency of a belt to work to the highest portion of a pulley, that furthest from the center, is caused solely by the stretching of one of its edges, does not appear to account for every case; as, if the belt is narrow, a mere string, it will, if it has adhesion to the pulley face, gradually work its way to the upper portion. Now if the belt, however wide, is held while the pulley turns, so that the centrifugal force cannot affect it, it will gradually slide down to the lower edge and slip off. Take the instance of a feed belt on an engine lathe. Its motion is very slow, yet every machinist knows that if he uses a belt (round) rather large for the scores in the pulleys, it will strive continually to ride the side flanges. Put the same round belt on a cone-shaped, smooth surfaced pulley and it will depart greatly from a right line in its efforts to attain the largest diameter of the pulley. It seems, therefore, pretty evident that centrifugal motion has much to do with the running of belts.

This force exhibits itself in many phases on machinery, and is put to many uses in aid of machine work. The copper-cased cartridges, now so generally used, have their heads filled with the fulminate by the utilization of this force. The head has an annular space, forming a collar, which is filled with the fulminate, but the central portion contains none of this percussion powder. The shells are held under a vertical spindle, the end of which is cut into radial scores, and revolving swiftly, throws the fulminate to the outer edge of the annular space.

All the calculations of that useful adjunct to machinery, the fly wheel, are based on the laws of centrifugal motion. The fly wheel by its aid becomes, for a time, actually a reservoir of mechanical power, apparently giving out more than it has received.

The centrifugal drying machine used in laundries is another exemplification of the employment of centrifugal force. It is an upright cylinder inclosing a smaller one, and the annular space between the two is for the reception of the clothes. A perforated bottom allows the moisture expressed from the clothes to run off. A rapid rotation being given the cylinder the clothes are compressed against the surface, so that with a rotary motion of 1,500 turns per minute the clothes are rapidly and perfectly dried.

This force is used in the drying of steel pens after being tempered, in separating ores from adulterations, and has been applied to the granulation of saccharine sirups. Its effect is very beautiful on the buff or emery wheel, where the particles of steel or iron in contact with the flinty particles of the emery take fire and burn brilliantly, being thrown off in a shower at a tangent.

THE CARE AND USE OF FILES.

A correspondent asks us for information relative to "the proper management and care of files." We can offer no facts not already familiar to practiced workmen, but may aid the tyro somewhat by a few directions. While the proper management—the use—of files is to be gained only by practice, there may be verbal suggestions made which will serve to direct the inexperienced in their proper care.

The top of the jaws of the vise should not be higher than the bent elbow of the workman. Our rule for setting a vise is the hight from the floor to the elbow when the arm is bent at right angles. We have, by experience, found this much better than raising it nearer the eye; it allows the forearm to traverse a horizontal plane, which is absolutely necessary to do correct work.

In selecting files those which are warped or sprung should be rejected; the mechanical eye can readily detect them without the use of any instrument, even when, as in the bastard file, the faces are convex. The handle is also another important matter. A chisel handle often used for a file is graceful in form, and, for a chisel handle just the thing, but is entirely unfit for a file handle. We do not prefer handles of beech, birch, maple, or hickory for files. Those are the best which are made of what the country people call "popple"—poplar—softer than the hard woods and harder than pine. Chunks of wood, pieces of broom handles, etc., are not proper handles for files, although often used by workmen who ought to know better.

Never put a new file on a casting until the scale has been removed, nor upon a forging of iron or steel. A very convenient and useful habit is to chalk one side of a new file and preserve that side intact until the other is pretty well worn. New files should be first used on brass, then cast iron, then wrought iron and steel. The scale of cast iron may be removed by grinding on the ordinary grindstone, when its form will permit, or by an old and worn file. The grand first requisite in filing is to learn to draw the file, both point and heel, in a right or straight line. No one can do this at the first trial nor until after long practice, generally. The two hands must be educated and trained to move in unison. Beginners always describe an arc of a circle when first attempting to file. Files are tender tools, especially some of the finer and smaller sorts, and it requires much experience and care to graduate the pressure to the strength of the file. No rule can be laid down for this; it is the result alone of practice.

Draw filing is quite an art and it is very important. It is moving the file transversely across the work. The file is taken in both hands, the handle in the right and the toe in the left, holding the file across the body. The drawing motion must be equal with both hands or the file marks will be "slashed" or diagonal. The proper style of draw filing is also the result only of practice. The beginner's right hand will tend to travel faster than the left. In file finishing and also in draw filing oil is often used on the file, as it produces a much better surface and prevents scratching.

Files are ordinarily cleaned by a piece of card, such as is used in cotton and woolen mills, tacked to a proper handle; but often in filing wrought iron small chips of the iron lodge in the teeth, producing scratches and refusing to be dislodged by the card. A simple implement for this purpose is a stout wire of soft iron, six or seven inches long, with a ring turned at one end for a handle, and the other flattened on the anvil, when cold, to a chisel point. To use it rest the toe of the file on the bench, hold the handle in the left hand, and with the right strike the wire's edge across the file in the direction of the teeth. Sometimes the file becomes clogged with oil and filings and cannot be perfectly cleaned by either of these methods. In that case hold it over the forge fire until pretty well warmed, then card it clean.

Cross-cut files are unfit for cutting the soft metals, as copper, Babbitt, and lead. Only single cut or "float" files are adapted to this work, and they should be quite coarse. As to recut files we do not recommend them. We have rarely seen a recut file which was worth half as much as a new one, and if this were generally the case the diminished cost is more than counterbalanced by the vexation of having a file break in the midst of a job. Better sell your worn-out files and buy new.

Inventors' Institute.

The inventors of Milwaukee County, Wis., have organized an association for mutual protection and scientific advancement, and propose to establish spacious and central rooms in the city for fortnightly meetings of practical and scientific discussion, and also for the collection of models, apparatus, books, etc. This is a movement of the right sort, and capable of great utility. The amount of error commonly cherished in regard to the first principles of mechanical science, and of ignorance as to the teachings of experience in every department of invention, is quite incredible to those who have not by considerable investigation learned how little they naturally know. The first and most valuable result of inventors' meetings would be to supply correct principles and habits of reasoning, and teach the necessity of consulting the experience of predecessors in whatever may be attempted. After these lessons are achieved, the application of truth to practice opens a limitless field for mutual suggestion, correction and assistance. "Union is strength," and intellects united are many times multiplied.

CITY PAVEMENTS.

If there is any one part of a city in which all the people are interested more than in another it is that part on which they travel. The streets belong to all, and their proper condition is a matter of importance even to the visitors whom the transaction of business or the pursuit of pleasure brings within its precincts. The main requisites of a good street pavement are evenness of surface, good foothold for horses, resistance to rolling pressure, and durability. In no one of these requisites are the streets of New York what they should be. Evenness of surface is impossible either with cobble stones or Belgian pavement; neither of them give a secure foothold for horses; they allow stones or blocks to become misplaced—sunk below the surface,—and they are not durable if by that term we consider good condition involved. Now if all these requisites can be attained by some other form and material of pavement there seems to be no adequate reason why it should not be adopted. Is there such a pavement?

From an examination of a compendium of facts now on our table—a pamphlet entitled "The Nicolson Pavement"—and from our own observations we incline to the opinion that there is. The Nicolson pavement has been in use in Chicago over ten years. So well satisfied are the authorities and people of that city with it that no other is laid there. None of it has yet worn to such extent as to need replacing, notwithstanding on some of the streets the heaviest loads are continually passing. On Wells street in that city, laid with this pavement, twenty-five barrels of flour is the ordinary load for a pair of horses, weighing, with the team, over three tuns, and some loads of pork and other merchandise are much greater; yet the pavement appears to have suffered no extraordinary deterioration during the nine or ten years it has been in constant use.

This pavement is much less noisy than the stone pavements, which is a feature of considerable importance in a crowded city. It affords a good foothold for horses, and if its durability, facility for removing and replacing when necessary, and first cost are as satisfactory as is claimed by its advocates, it should be tested on some of our principal streets, as well as on a portion of two or three, more or less removed from the center of vehicular business.

THE PATENT BILL PASSED.

The bill to increase the efficiency of the Patent Office, noticed in our last number as having passed the House, soon after came up for action in the Senate, and was amended by striking out the sections relating to a Solicitor for the Patent Office, Disbursing Clerk, etc. The House promptly adopted the amended bill, and the Commissioner is now clothed with ample authority to increase the examining force of the office. We understand that he intends to fill all new positions by promotions, which is certainly very commendable: therefore the crowds who are daily hanging about the hall in front of the Commissioner's door may as well disperse.

We earnestly hope that the Commissioner will act promptly and energetically in carrying the new measure into effect. The business of the office is suffering very much from the delay which attends the examination of cases, and now that the Commissioner has the power, we hope that he will employ it to infuse new life and vigor into the Department.

THE DAY LINE.

The question of the beginning of the day, which we started in our issue of March 2d, has attracted a great deal of attention. It has been discussed in the newspapers, in debating societies, and at private gatherings all over the land. The question has appeared to be many-sided, for the opinions on it are very far from being harmonious. Some persons have gone so far as to contend that there was nothing in it at all, and even to hint that it was intended on our part as a kind of practical joke aimed at our readers!

But on reviewing the whole subject we find that we and our correspondents have expressed all the facts and opinions about it that seem of importance, and therefore we conclude that it is time to dismiss it from the paper. To the many correspondents whose letters have not been printed we tender our thanks for their kindness, and our regrets that space will not admit a continuation of the discussion.

British Art Schools.

A published government directory gives a list of ninety well established and sustained schools of art in the United Kingdom, which in the year 1865 taught no less than 16,621 pupils. The first of these schools was established in 1842, and already there is not a commercial or manufacturing town in the British isles that is not thus provided. Parliament annually appropriates a large sum of money to this system of schools, with a view to foster British manufactures by giving them the advantage so long possessed by the French, of beauty, finish and taste in design. The whole is a regularly organized department of science and art, of which the Duke of Buckingham is President, with a large staff of secretaries and clerks, and two divisions of professional inspectors, examiners and organizers, to aid in organising schools, to supervise them while in operation, to test their efficiency, and to judge when they are entitled to aid from the fund in charge of the department. A project is on foot to establish an American University of Art.

ISSUED FROM THE U. S. PATENT OFFICE,

FOR THE WEEK ENDING MARCH 26, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

63,131.—MACHINE FOR MAKING EYELETS.—Samuel W. Adams (assignor to the American Eyelet Company), Providence, R. I. Antedated March 12, 1867.

First, I claim the improved mode of constructing and operating the compound male cutter, *b*, former, *l*, and punch, *i*, as described for the purpose specified.

Second, I claim a pair of reels, C C', for holding and delivering, and for taking up the metal strip in combination with the eyelet-forming instruments for forming eyelets therefrom, substantially as described.

Third, I claim a pair of sliding clamping jaws constructed and operating as described in combination with suitable instruments for forming eyelets from a metal strip, as described for the purpose specified.

Fourth, I claim, in combination with the eyelet-forming instruments, constructed substantially as described, a clipping or trimming mechanism for trimming off the perforated portion of the stock as it passes through the machine substantially as described.

Fifth, I claim the clearing punch, V, in combination with the compound female cutter and forming die, substantially as described for the purpose specified.

Sixth, I claim the clearer, *v*, substantially as described for the purpose specified.

63,132.—SEWING MACHINE.—Frank Armstrong, Waterbury, Conn.

First, I claim constructing the plate, A, of the attachment with the slot or aperture, *b*, whereby the said attachment can be readily adjusted and secured upon the machine and removed therefrom, substantially in the manner set forth.

Second, The combination and arrangement of the under spool support with the said attachment so that when secured upon a Wheeler and Wilson sewing machine the under thread spool, Y, will be entirely under the front edge of the cloth plate of the machine, substantially as and for the purpose set forth.

Third, The employment, in combination with the slotted plate, A, of the adjustable slotted plates, *k*, substantially in the manner and for the purposes described.

Fourth, The employment of the guide, C', in combination with the under thread carrier, tension device and spool, to allow the latter to be arranged under the cloth plate, *a*, and in the position relatively to said thread carrier and tension device, all substantially in the manner and for the purpose herein set forth.

63,133.—PERMUTATION LOCK.—George B. Atwood (assignor to Alfred A. Oat), Philadelphia, Pa.

First, I claim making the plug, B, cylindrical and with an annular groove, *b2*, therein, substantially as and for the purposes described.

Second, I claim the employment of the recessed central disk, H, for controlling the bolts, G, the said disk being constructed and arranged to operate substantially as described.

Third, I claim the employment of the surrounding recessed disks, D, for the purpose of locking the central disk, H, the said surrounding disks, D, being constructed and operated substantially as described.

Fourth, I claim moving the slides, A, by means of the respective cams, C, substantially in the manner described.

Fifth, I claim operating the inclosed or invisible disks, D, and cams, C, by means of the exposed or visible indicating disks, E, or equivalents, substantially in the manner described.

Sixth, I also claim the employment of the combination consisting of the recessed disk, *h*, with the four recessed disks, D, whereby they reciprocate with each other, in the manner and for the purposes described.

63,134.—SHOVEL-PLOW GUARD.—William J. M. Batchelder, Dayton, Ohio.

I claim the shovel-plow guard, E, when constructed substantially as herein described and for the purpose specified.

63,135.—BEE FEEDER.—James M. Beebe, Casadaga, N. Y.

First, I claim the construction of a bee feeder with an apartment for sugar liquid and an apartment for water provided with racks or floats, E, and an apartment for flour or other food, with a central passage way, C, and door, H, all combined substantially as described.

Second, A bee feeder having a central passage way, C, for the entrance of the bees, slide door, H, and glass cover, B, for the purpose substantially as described.

63,136.—COTTON GIN.—John B. Brackett, and Wyman Dearborn, Boston, Mass

First, We claim the rolls, C C', constructed as described, as arranged with the belt, D, in combination with the sliding bearing, J, and levers, I, with their variable fulcra, substantially as and for the purpose described.

Second, The rolls, C C', constructed as described, in combination with the convex pressure bar, E, and endless belt, D, arranged and operating as and for the purpose described.

Third, The arrangement of pressure roll, in combination with belt, D, when arranged as described in connection with rollers, C C', and pressure bar, E, as and for the purpose described.

Fourth, The arrangement of slotted levers, G, in combination with clearer, F, and cross shaft, *n*, and further combination of said clearer levers and crank shaft with rods, m, as and for the purpose described.

63,137.—STEAM GENERATOR.—W. Buchanan, New York City, and J. M. Toucey, Poughkeepsie, N. Y.

First, We claim the divided fire-box, B C, when constructed and arranged substantially as and for the purposes herein set forth.

Second, We claim the arrangement of the fire box by which we are enabled to readily disconnect, remove, and replace the lower portion, as herein set forth and described.

Third, We claim the hollow ring, H, and its connections protected from the direct radiant heat of the fire and adapted to throw fresh air and steam into the gases rising through the hole, D, or its equivalent, substantially in the manner and for the purpose herein set forth.

Fourth, We claim the steam blow pipe, *d*, with its nozzles, *m*, and connection, *k*, arranged as represented relatively to the air pipe, H, and nozzles, *h*, substantially as and for the purpose herein specified.

63,138.—MANUFACTURE OF STONE WARE.—Edgar T. Chapman, Middlebury, Ohio.

I claim a crock, constructed as hereinbefore described, being a new article of manufacture.

63,139.—GRAIN SHOVEL AND HANDLER.—Fayette Clark, Marcellus, N. Y.

I claim the principle of putting the labor of handling grain equally upon both hands, it being in shape like the accompanying drawing or any other shape substantially the same and which will produce the same effect, namely, the placing of the weight of grain equally on both hands.

63,140.—FENDER FOR CORN PLOWS.—Robert Cook, Franklin, Ohio.

First, I claim, The yielding and adjustable fender, D, attached to a plow beam by mechanism, substantially as and for the purpose specified.

Second, The construction of the disks, C and C', for holding the fender, D, operating substantially as and for the purpose described.

Third, The combination of the fender, D, disks, C and C', with the beam plate, A, and spring, B, arranged substantially as and for the purpose described.

63,141.—COMBINED NAME PLATE AND LETTER SLIDE.—J. M. Combs, Boston, Mass.

I claim the combined arrangement as and for the purposes set forth of a name plate pivoted to a flange which has a metallic chute fixed thereunto by which the flange and plate are held to the surface by which the back of said flange is in contact.

Also constructing the metallic chute in two pieces each with an exterior flange and naming and holding them in their place by means of the spring letter, L.

63,142.—SCAFFOLD.—Charles Crow, Onargo, Ill.

I claim, First, The combination of the jointed rack, H, jointed standards, F, and bars, V, when constructed to operate the platforms, Z, substantially as set forth.

Second, The combination of the sliding bar, T U V, platforms, L, and frames, A B, substantially as set forth.

63,143.—HAND-POWER LOOM.—J. M. Dean, W. B. Bolding and H. Perry, Dayton, Iowa, assignors to themselves and E. G. Whetstine.

We claim, First, Operating the treadles, H H, by means of the levers, F and G, jointed connecting rod, E, the feed hand, b, and ratchet, c, with the wipers, d, arranged and combined with the batten, B, in the manner and for the purposes set forth.

Second, The levers, L, feed hand, i, shaft, M, and arms, N, in combination with the tumblers, K, picker staffs, I I, and batten, B, substantially as and for the purpose set forth.

63,144.—HOOP FOR SKIRTS.—Thomas B. De Forest, Birmingham, Conn.

I claim hoops for skirts formed by the introduction of elastic metallic warps in the fabrication of the hoop, substantially as described, as a new article of manufacture.

63,145.—HOOP SKIRT.—Thomas B. De Forest, Birmingham, Conn.

I claim securing the hoop and tape by one or more indentations or enlargements of the hoops, substantially as herein set forth.

63,146.—APPARATUS FOR HATCHING EGGS.—Peter Degive, New York City.

I claim the screw, C, and rod, D, or its equivalent in combination with the train of gears, E, the door or damper, G, and hatching box, K, substantially as and for the purposes described and set forth.

63,147.—SEED PLANTER.—James Edge, Acquackanonck, N. J.

I claim, First, The movable throat, *s*, at the base of the seed hopper, in combination with the seed-measuring disk, o (made changeable), and with the seed tube, d, as and for the purposes specified.

Second, The frame, K, hinged to a frame, *s*, and detachable as shown in combination with the hopper, r, wheels, l and c, miter wheels, m and n, and seed-measuring disk, o, as and for the purposes set forth.

63,148.—STEAM MOTOR FOR TOYS.—Philip Ely (assignor to J. M. Keep & Co.), New York City.

I claim the revolving boiler, C, provided at the center of its concave bottom with a conical projection, b, which is fitted on the rod, B forming the bearing for the boiler and having its upper end the arms, D, and adapted to bear the strap or band, F, by which motion is communicating to the toy, E, as and for the purpose described.

63,149.—FEEDING MECHANISM FOR SEWING MACHINES.—George A. Fairfield, Hartford, Conn.

I claim the combination of the eccentric, H, operating upon a regulating lever, K, rocking shaft, L, cam, F, and feed bar, N, or their equivalents, to produce a four-motion feed, substantially as described.

I also claim cam, M, having an eccentric surface whereby the feed bar is raised and dropped and hooks or stops for producing horizontal motion in the feed bar.

63,150.—GRATE FOR STOVES.—Moses P. Farnham, Janesville, Wis., assignor to self and Daniel P. Farnham.

I claim, First, The supplemental fire box, A, for stoves and furnaces having a movable bottom or grate, D, that may be placed on different bearings, B, substantially as and for the purposes described.

Second, The general arrangement of a supplemental stove fire-box with grate, D, bearings, B, flue, G, fire grate, E, when the whole are constructed and arranged substantially as and for the purposes described.

63,151.—PLOW.—Joseph Fowler, Hartland, Wis.

First, I claim adjusting the draft vertically by the wedge, n, beneath the cross pin or T-front end of the plow standard in combination with the wedge, l, to clamp the standard in the beam, as set forth.

Second, The screw bolt, l, or its equivalent, fitted as specified in combination with the standard, c, introduced in a mortise of the beam so as to adjust the draft horizontally, as set forth.

63,152.—PUMP.—Andrew Fuller and Francis J. Bray, Buffalo, N. Y.

We claim the elastic strips, A B and B, in combination with the staff, A and sucker, H, substantially as described.

63,153.—BED BOTTOM.—George L. Gerard, New Haven, Conn.

I claim the the combination of the clamp bolt, D, with the slotted spring, A, and the bar, C, constructed so as to operate in the manner described.

63,154.—RAKE.—Benj. F. Gladding, Providence, R. I. Antedated March 10, 1867.

First, I claim constructing the rake head double or of two pieces of metal secured together, substantially in the manner described for the purpose specified.

Second, The combination of a rake head, constructed as described, and a forked shank, the two parts being united, substantially as described.

63,155.—APPARATUS FOR REGULATING THE EXHAUSTER IN GAS WORKS.—Joseph A. Harris, Philadelphia, Pa.

First, I claim the within-described regulator consisting of a vessel inclosing two chambers partly filled with water communicating with each other and one chamber communicating with the main pipes, through which gas is exhausted from the retorts while the other chamber has a float connected to the throttle valve of the steam engine which drives the fan or other exhausting device, all substantially as set forth.

Second, The branch pipe, J, its enlargement, X, and valve, l, arranged in respect to the exhausting main and discharging pipe, substantially as described for the purpose specified.

63,156.—BRIDLE BIT.—William B. Hayden, Columbus, Ohio.

First, I claim a bridle, or harness bit which has its rein rings attached to the mouth piece by passing the check pieces through solid eyes formed on said parts substantially as described.

Second, A bit which is composed of separately formed parts A, B, C and d, put together substantially as described.

63,157.—SASH FASTENER.—Gustave Franz Hedrich, Buffalo, N. Y.

I claim the improved fastener consisting of the combination of the sliding knob H, or its equivalent, pivoted lever C, provided with the bolt g, and spring e, arranged and operating substantially as set forth.

63,158.—ELECTRIC CIRCUIT-BREAKING CLOCK.—Edwin Holmes, New York, N. Y.

I claim the combination as well as the arrangement of the circuit breaker B, its adjuster C, and the spring D, with a clock or time piece A, and an electric or electro magnetic circuit, the whole being substantially as and for the purpose hereinbefore specified.

63,159.—METHOD FOR MAKING DIES FOR FIGURES IN PRESS DYED FABRIC.—John Holt, Lowell, Mass.

I claim the method substantially as herein described of making the impression dies which produce the figures in press dyed fabric.

63,160.—ORE CRUSHER.—Bennet Hotchkiss and S. C. Goodsell, New Haven, Conn.

We claim, First, The shaft F, with double cranks I I straps L and L', hammer C, box O, when constructed and arranged to operate together substantially as described.

Second, The tubes S and T, when constructed as described and used in connection with box O, for the purpose substantially as specified.

Third, Controlling the force and rapidity of the blows of the hammer by means of the treadle m, cord h, spring e, pulley f, and plate d, when operating as and for the purposes set forth.

63,161.—RAILWAY TRACK.—B. B. Hotchkiss, New York, N. Y.

I claim the construction and arrangement of a street railway track in sections consisting of the cast iron cellular base parts in which are inverted blocks of wood fitting therein with the rails arranged upon the outer sides of said track, and held in position as herein set forth.

63,162.—PAVEMENT.—B. B. Hotchkiss, New York, N. Y.

First, I claim fitting wood blocks in cast iron cells or cavities by employing blocks of less size than the cells and driving a packing H into the spaces between the blocks and the sides of the cell, substantially as and for the purpose herein specified.

Second, I claim in connection with the above, the stopping material G, introduced in the bases of the cells opposite the bottoms of the blocks, and adapted to prevent the working of any of the packing under the wood, substantially as herein specified.

63,163.—EXTENSION LADDER.—Geo. L. Johnson, Fairfield, N. Y. Antedated March 15, 1867.

I claim the combination of the hook A, of the slide B, and socket C, all constructed, arranged and operating in the manner and for the purpose specified.

63,164.—NECKTIE.—George A. Keene, (assignor to himself and Jos. E. Manning), Boston, Mass.

I claim fastening wing piece, knob band and tie strip together and attaching the elastic ring by means of the clinch bar, as shown, illustrated and described.

63,165.—MACHINE FOR GRINDING CARDS.—S. G. Ladd and G. W. Crown, Lowell, Mass.

We claim the two central shafts A C, revolving at different velocities, causing the grinding cylinder to revolve by means of the hub d, and to reciprocate longitudinally by means of the hub k, groove g, pin h, slot f, and pin e, in the manner and for the purpose substantially as described.

63,166.—WIRE BALE TIE.—Osborne Macdaniel, New York, N. Y.

I claim the construction of a wire bale tie fastened with hooks and eyes, substantially as herein described.

63,167.—TRUNK.—R. McMurray, Washington, D. C.

I claim the stay A, in combination with a coiling device B, substantially as and for the purposes set forth.

Also, I claim constructing and applying a trunk-stay so that one end shall be drawn into the trunk frame, substantially as and for the purposes set forth.

63,168.—FOUNTAIN PEN.—George R. Melten, St. Louis, Mo., assignor to Horace Baldwin, Painesville, Ohio.

In combination with an air-tight and flexible ink sack, which is applied within the handle or holder of a fountain pen, so as to be free to collapse as the ink flows from it, I claim a tube e, which extends beneath the pen f, and is provided with a valve g, at the point of discharge, so that in the act of writing the ink shall be caused to flow to the pen, with greater or less freedom according to the force and rapidity of the strokes, substantially as specified.

Second, A fountain pen which is provided with a thin, air-tight, flexible sack, applied within the pen handle or holder, by means of a ring c, in combination with a removable pen sheath d, and supply tube e, substantially as described.

Third, In combination with the flexible sack b, and with supply tube e, I claim the conical valve or plug g, acting as a regulator during the act of writing, and serving to close the aperture when there is no pressure applied to the nib of the pen, substantially as described.

63,169.—CURTAIN FIXTURE.—Purches Miles, New York, N. Y. Antedated March 15, 1867.

I claim the cord holder g, in combination with a cord for curtain fixtures, upon which cords are knots or projections substantially as and for the purposes specified.

63,170.—ASH SIFTER.—Charles F. Meyer, Troy, N. Y.

First, In combination with a revolving drum sifter D, and right and left inclined fixed guide plates H and H', I claim the reversing or shifting guide plate E, constructed and arranged substantially as described and operating in manner and for the purpose as set forth.

Second, In combination with a drum sifter D, right and left fixed guide plates H and H', and a shifting guide plate E, I claim the employment of two ash pans or boxes G, and G', arranged in manner and for the purpose as described.

Third, In combination with a revolving drum sifter D, right and left fixed inclined guide plates H and H', and two ash pans or boxes G and G', arranged as shown, I claim placing the journals of the shifting guide plate E, eccentrically, to operate in manner and for the purpose as herein shown.

63,171.—KNIFE AND WATCH KEY COMBINED.—E. Q. Morton, (assignor to himself and Alpheus Patten), Bangor, Maine. Antedated, March, 13th, 1867.

I claim as a new article of manufacture the aggregation of the pen knife blade and watch key in one handle as set forth.

63,172.—CROSS BOW.—Edward C. H. Nye, Ascushnet, Mass.

I claim the combination of the cross bow, the arrow magazine and a mechanism for setting and discharging the cord of the spring of the bow the whole being substantially as herein before described.

63,173.—ROUNDING JACKS FOR TRIMMING BRIMS OF HATS.—Starr Polley, (assignor to Ambrose Hill,) Brooklyn, N. Y.

First, I claim the cutter b, the head bl, adjusting screw C, removable bearings M, and confining means D combined and arranged for joint operation on the sliding block B, of the brim cutting instrument, substantially in the manner and for the purpose herein set forth.

Second, I claim the radial adjusting screw G, arranged to operate relatively to the sliding block B, and adjustable cutter b, in the brim-cutting instrument, substantially in the manner and for the purpose herein set forth.

Third, I claim the shield E, arranged in combination with the brim cutter and adapted to serve relatively to the adjustable cutter b, substantially in the manner and for the purpose herein set forth.

63,174.—PROCESS FOR TREATING INDIAN CORN.—E. F. Prentiss, Philadelphia, Pa., and C. C. Parsons, Boston, Mass.

We claim the process of treating Indian corn in the manner and for the purposes substantially as described.

63,175.—PREPARATION FROM INDIAN CORN.—E. F. Prentiss, Philadelphia, Pa., and C. C. Parsons, Boston, Mass.

We claim the preparation from Indian corn, made substantially in the manner described.

63,176.—COTTON CHOPPER.—Koscinsko Puckett, Parish of Morehouse, La.

I claim the combination of the driving wheel A, the balance wheel G, pinion B, shaft C, and hoe D, with the frame E, and its appurtenances when their several parts are arranged and constructed as described for the purposes set forth.

63,177.—MACHINE FOR EMBOSSING ARTICLES OF WEARING APPAREL.—George W. Ray, Springfield, Mass.

First, I claim the roll c, covered or partially covered with a woven fabric in combination with the roll d, substantially as described, and for the purpose set forth.

Second, The plate p, in combination with the roll c, and roll d, one or more of these parts being covered, all substantially as described and for the purpose set forth.

63,178.—CARPET BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim in combination with the corners d, made by lapping the metal, the bead e, extending around these corners and along the angle of the frame substantially as set forth.

Also the manner of applying the flexible bag forming material to the frame, by means of the metal strip g, folded over the folded edge of the cloth or leather, and the edge of the frame, and secured to the frame by rivets or other fastening devices, substantially as set forth.

63,179.—CARPET BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim the manner of connecting the flexible bag material to the frame by means of the strip d, and the frame groove b, the strip and cloth or leather, being first united and then connected to the frame as herein set forth and described.

Also the reinforcement of the corner, by leaving the goring piece g, in the frame, and turning it down against and so as to form part of the wall piece f as herein set forth and described.

63,180.—SIFTER FOR SAND, ETC.—Samuel C. Rundlett, Portland, Maine.

I claim the sieve j, when suspended by the four chains i, and so operated by the means hereinbefore described as to swing from side to side and at each motion to strike the inner side of the frame A, as and for the purposes specified.

63,181.—SCRUBBING BRUSH.—S. C. Rundlett and R. Dodge, (assignor to themselves and John L. Meserve), Portland, Maine.

We claim a scrubbing brush having the arrangement of the jointed handle e, and rubber band f, as and for the purposes set forth.

63,182.—SHAFTING COUPLING.—Silas C. Schofield, Chicago, Ill.

First, I claim providing the coupling forks or heads B, with gudgeons or their equivalents D, substantially as and for the purposes specified.

Second, I claim constructing the ring A, with two chambers a, provided with lateral opening b, substantially in the manner and for the purposes set forth and shown.

Third, I claim the combination of the forks or heads B, provided with the gudgeons D, or their equivalents with the chambered ring A, arranged and operating substantially as specified and for the purposes described.

63,183.—HEMP BRAKES.—Simeon Sherman, Weston, Mo.

I claim the endless chains provided with bars or slats and operating in connection with the reciprocating rotary beaters, substantially as described.

I claim the arrangement of the beaters whereby the upward blow of the lower set of knives and the downward blow of the upper set are made to conjoin their actions upon the interlying hemp substantially as described.

I claim the combination with an endless carrier and reciprocating rotary breaker of a preliminary series of toothed rollers.

63,184.—MEANS FOR PROPELLING CANAL BOATS.—Greenleaf Stackpole, New York, N. Y., assignor to himself and T. Spear, Jersey City, N. J., and Cyrus and Darius Cobb, Boston, Mass. Antedated March 13, 1867.

I claim the wheels g, l, and clamp k, l, in combination with the radius arm b, horizontal driving shaft a, boat A, and rail h, constructed and operating substantially as and for the purpose described.

63,185.—PISTON PACKING.—Theodore Thurber, Auburn, N. Y.

First, I claim the construction of the internal ring plate A, with ring cap B, fitted, leaving a steam chamber or recess a, between them and the metal ring packing c, so that it can be put in its place without opening or expanding substantially as described.

Second, I claim the valves e e, as constructed in combination with the ring plate A, and cap B, operating from both sides or faces of the piston they being supported by the spring d, so that steam, gas or water forced into the chamber a, is not exhausted or liberated at each stroke, the internal force being retained, thereby producing the result substantially as herein specified.

Third, I claim the combination of the skeleton frame and plate E, flange plate A, ring cap B, face plate F, metal packing ring C, valves e e, and spiral spring d, all constructed and arranged to operate substantially as and for the purposes herein set forth.

63,186.—IRONING MACHINE.—William M. Tobey, New London, Conn.

I claim the shirt bosom ironing-machine made substantially as, and to operate as described, viz: of the chambered polisher (to be heated as described) the mechanism to operate or move such polisher, the platform for supporting the work, the mechanism for moving such platform laterally and vertically in manner as specified the whole being applied to a frame and so as to operate substantially as hereinbefore explained.

63,187.—WEATHER STRIP.—L. W. Turner, (assignor to himself and G. S. Wilcox, Yalesville, Conn.

I claim the combination of the lever D, with two sections A B, spring E, when the two sections are arranged so as to be operated simultaneously, substantially in the manner described.

63,188.—EXTENSION LADDER.—Calvin G. Udell, Chicago, Ill.

First, I claim, in combination with a section or sections of an extension ladder, the pivoted catches, D, arranged and operating substantially as and for the purpose specified.

Second, I claim the combination of the sections, A B, the catches, D, and and bar, C, arranged and operating substantially as described.

63,189.—SAND TRAPS FOR WATER PIPES.—Joseph D. West, New York City.

I claim the gauze or perforated diaphragm check, A, or its equivalent, re

Oliver, C, hollow disk, B, or its equivalent, and induction pipe, D, whether provided with a valve cover or not, when all combined and arranged together so as to operate substantially in the manner and for the purpose described.

63,190.—CAR TRUCK AND SPRINGS.—Levi H. West, Cambridge, Mass.

I claim the combination as well as the arrangement of the additional levers, D'' D'', their springs, F''' F''', and supporting rods, c'' c'', with the platform, A, the wheel boxes, a a, and the levers, D' D', rods, c' c', and springs, F' F', substantially as and for the purpose described.

I also claim the combination as well as the arrangement of the springs, f e F', and the suspension rod, e', with the lever, D', the wheel box, a, and the platform, A.

I also claim the combination as well as the arrangement of the hanger, l, and the staple, h, with the platform, A, the wheel box, a, and the supporting levers, D' or D' D'', applied to such box and platform.

I also claim the combination as well as the arrangement of the springs, i, with the hanger, l, the box, a, the platform, A, and the supporting levers applied to such platform and the wheel box or boxes, the whole being substantially as hereinbefore specified.

63,191.—MACHINE FOR SHAVING HIDES.—T. F. Weston, Salem, Mass.

I claim the use of the cutting, shaving, or scraping tool, having such motion imparted to it by any suitable arrangement of mechanical devices as to produce a drawing cut upon the surface of the leather, as hereinbefore set forth and for the purpose specified.

63,192.— HARVESTER. — William N. Whitely, Jun., Springfield, Ohio.

First, I claim the rake guide rail, N', and arch, S', when attached to the main frame by a bolt in front of the cutting apparatus, and another bolt behind the said cutting apparatus, and without any connection with the platform, substantially as described and shown.

Second, I claim in combination with the internal gear wheel, J, and its arriving pinion, M, the pitman, K, and rake, Q, substantially as and for the purpose set forth.

Third, The combination and arrangement of the sector plate, C, curved standard, D, and standard, E, substantially as described.

63,193.—FRUIT JAR.—B. B. Wilcox, New Haven, Conn.

I claim the yoke, D, and divided ring, C, in combination with a jar, A, and cover, B, when constructed and arranged so as to operate in the manner herein set forth.

63,194.—TAKE-UP FOR BRAIDING MACHINES—Gilman K. Winchester, Providence, R. I.

I claim the adjustable feed or take-up stand, so constructed as to be readily moved forward and backward to allow a larger or smaller worm wheel to be placed upon the feed-roll shaft to connect with the worm upon the worm shaft, substantially as and for the purpose set forth.

63,195.—COMPOUND FOR THE CURE OF GLANDERS ETC., IN HORSES.—John Althouse, East Cocalico Township, Pa.

I claim the composition of my powder for the cure of glanders and farcy in horses, when combined and administered substantially in the manner specified.

63,196.—STOVE-PIPE DAMPER.—T. K. Anderson, Hornellsville, N. Y.

I claim the pivoted damper, B, stop, D, tube, E, and weighted lever, F, or its equivalent, combined to operate together, and arranged with the stove pipe, A, substantially as described for the purpose specified.

63,197.—MANUFACTURE OF MATCHES.—Emery Andrews and William Tucker, Fiskedale, Mass.

We claim notching and dipping the cards preparatory to cutting the matches therefrom, substantially as and for the purpose specified.

63,198.—COMBINED STEAM AND AIR ENGINE.—John B. Atwater, Chicago, Ill.

First, I claim a desiccating or superheating chamber, E, which is combined with a steam boiler, and adapted for receiving and desiccating steam mixed with a F, substantially as described.

Second, The combustion chamber, D, when arranged in a steam boiler and supplied with air, substantially as shown, so as to effect the combustion of the gases, after they have escaped from the fire box or chamber, substantially as described.

Third, The air injector operating upon the principle specified, in combination with a desiccating chamber, E, substantially as described and for the purposes explained.

Fourth, The arrangement of the steam generators, C C', with steam communications, B, leading into generator, C, above the water level therein, with respect to the desiccator, E, substantially as and for the purpose described.

Fifth, The desiccator, E, constructed as described, arranged within the circle of tubes for the purpose set forth.

Sixth, The valve, L, on the end of pipe, Z, in combination with apparatus constructed and operating substantially as described.

Seventh, The combination of an air chamber, G, and cock, P, with an apparatus constructed and operating substantially as described.

63,199.—ROTARY HARROW.—Caleb Bates, Kingston, Mass.

I claim the combination and arrangement of the arms, b, axis, c, perforated rear bars, e, curved bar, E, and swinging blades, F, constructed and operating substantially as described for the purpose specified.

63,200.—TREE DIGGER.—Joseph H. Black, East Windsor, N. J.

I claim the employment of the plate, C, constructed substantially as represented and used in combination with the beams, A A, as and for the purpose set forth.

63,201.—ELECTRO-MAGNETIC APPARATUS FOR REGISTERING VOTES.—John Blackie, New York City.

I claim, First, The combination of a series of hollow magnets for ejecting the balls as described, with the receiving troughs, c, and tubes, B, arranged to operate substantially as shown and described.

Second, In combination with the tubes, B, open at their lower ends, I claim the drawer, D, provided with the stop, n, when arranged to operate as herein described.

63,202.—RAILROAD FROG.—N. P. Bowler, Cleveland, Ohio.

I claim making railroad frogs by the method and in the manner substantially as and for the purpose specified.

63,203.—VENT PEG AND VALVE FOR CASKS. —Stephen Bourne, Headstone Drive Harrow, England.

I claim a valve made of india-rubber or other elastic or suitable material, whether in the form of a disk cone cylinder or any other proper shape, when said valve is provided with one or more perforations, slits, or other openings, in such a manner that by the distension of the valve its perforations will be opened, but closed by its elasticity, substantially as and for the purposes described.

63,204.—DOOR LOCK.—Edward W. Brettell, Newark, N. J.

First, I claim the encasing of a series of self-acting vertical-sliding tumblers, with their operating dog, within an independent detachable case, substantially as herein shown and described.

Second, The dog, d, attached to the lever, B, so as to act independently of both the bolt and the lock case, substantially as herein shown and described.

63,205.—SHEARS FOR BRUSHES.—Charles Brombacher, New York City.

I claim the triangular opening in the bed shear, a, in combination with the swinging blade or shear, b, hinged directly to the shear, a, and acting as a clamp and cutter, as specified.

63,206.—INSULATOR FOR TELEGRAPH WIRES.—David Brooks, Philadelphia, Pa.

I claim the metal casing, A, insulating block, B, and stem, C, arranged and constructed as described, when the same are combined with arms or holders, b b, so arranged that the distance between the holders and the case is less than that between the stem and the case.

63,207.—REST FOR GRINDING TOOLS.—James H. Brown, Berea, Ohio.

I claim the stem, A, adjustable sides, D, pivoted to the arms, C, in combination with the arms, B, hooks, G, and staple, b, provided with screws as and for the purpose set forth.

63,208.—POWDER MIXER.—Jabez Burns, New York City.

I claim the spiral flanges, f f', running in opposite directions, in combination with the movable head, c', drum, A, and standards, B, with hand friction rollers, constructed and operating substantially as and for the purpose set forth.

63,209.—AIR PUMP.—Daniel Carpenter, Peekskill, N. Y.

First, I claim the mechanism herein shown and described for operating the valve, E, automatically by the same power which operates the piston, so that the valve is opened and closed and the piston raised and lowered, substantially in the manner herein set forth.

Second, I claim the piston, F, and valve, E, when so constructed that the piston fits perfectly over the valve, so that all the air is completely forced out of the cylinder, A, at each stroke of the piston through the valves, c c, substantially as herein shown and described.

Third, I claim the perforated piston, F, in combination with the ring, d, and conical plugs, c c, all made and operating substantially as herein shown and described.

Fourth, I claim the arrangement in the chamber, B, below the valve, E, of the valve operating parts, substantially as and for the purpose herein shown and described.

Fifth, I claim the box, G, when constructed as herein shown and described, and when provided with braces, H I and K, all made as set forth, in combination with the pipe, f, and air pump, A B, the latter being made and operating substantially as herein shown and described.

63,210.—WASHING MACHINE.—C. L. Carter, Union, Ind.

I claim the arrangement of the perforated box, C, and compresser, D K, and the strap, G, constructed and operating in the manner and for the purpose herein specified.

63,211.—BROOM HEAD.—Orlando L. Castle, Upper Alton, Ill.

First, I claim the use and employment of a spring, B, for the purpose and operating substantially after the manner herein set forth.

Second, A combination of the spring, B, the wedge, C, and the nuts, n n, with the sheath, A, arranged and operating substantially as herein described and for the purpose herein set forth.

63,212.—MODE OF ELEVATING HAY FORKS.—John H. Chapman, Utica, N. Y.

First, I claim in a hay-fork elevating apparatus, or the like, the post, A, in combination with the draft rope, G, and ground pulley, H,

Second, The pulley, E, and the casting-off plate, F, constructed and operating in combination substantially as described.

63,213.—WOOD-TURNING LATHE.—James Chase, Rochester, N. Y.

First, I claim the employment of a pattern knife or cutter in wood-turning lathes, rotating upon an axis, arranged at right angles or nearly so to the stick or timber which is being turned, and so geared to the frame of the lathe as to leave its pattern upon the stick, substantially in the manner and for the purposes set forth.

Second, The employment of the pivoted box, M, which constitutes the axial bearing for the knife journal or shaft, N, when the parts are arranged and operate substantially in the manner and for the purposes herein shown and described.

63,214.—DOOR LOCK.—S. L. Chase, New York City.

I claim, First, The circular ward, e, on the disk, b, substantially as and for the purpose described.

Second, The bridge, b, in the circular ward, substantially as and for the purpose set forth.

Third, The partition, i, in the circular ward, as and for the purpose described.

Fourth, The nose, f, on the disk, b, in combination with the key, the pins, c, stops, d, tumblers, B, and with the bolt, all constructed and operating substantially as and for the purpose set forth.

63,215.—APPARATUS FOR CARBURETING AIR, ETC.—William H. Clarke, St. Anthony's Falls, Minn.

I claim, First, The arrangement of the plates, I I, in the cylinder, B, and providing the same with air pipes, b b, supply pipes, M M, discharge pipes, L L, and gas transmitting pipes, J J, substantially as and for the purpose specified.

Second, The combination with the cylinders, A and B, float, C, bellows, T, and tank, O, provided with lime and cotton as and for the purpose specified.

Third, The arrangement of the pipe, H, with the pipe, P, for supplying heat to the machine from its own gas, substantially as specified.

63,216.—CHURN.—Joseph C. Clymer, Galvin, Ohio.

I claim in a churn the cover, F, and its channel, c, arranged and operating as described and set forth, in combination with the stuffing box, G, key, H, stirrups, I, and adjustable lever, E, substantially as and for the purpose set forth.

I claim the channel, c, in a churn cover, arranged and operating as and for the purpose described.

63,217.—BREECH-LOADING FIRE-ARM.—J. W. Cochran, New York City.

I claim, First, The sliding breech piece, A, and swinging brace, B, jointed together at a, and arranged for operation substantially as shown and described.

Second, The arrangement of the elastic packing, D, with or in the movable breech at its forward end, operating not only to hold said breech when closed and make tight its joint in front, but serving without restraining the self-adjustment of the breech piece to prevent concussion of the latter against the gun chamber on closing the breech essentially as specified.

Third, The cartridge shell extractor, F, constructed with its rear end inclined or beveled on its upper and lower sides, as at i h, operating in connection with the inclined recess, l, in the rear end of the receiver, C, substantially as and for the purpose set forth.

Fourth, The sliding rod, H, with its forward lip, n, and rear projection or head K, hung and arranged for operation, in combination with the brace, B, hammer, G, and detonating pin, L, substantially as specified.

63,218.—METHOD OF OPERATING RAILROAD SWITCHES.—Gilbert M. Cole, Folsom City, Cal.

I claim, First, The mechanism herein described for rendering a railroad switch absolutely self-adjusting as the train approaches it on either branch of the double track, in combination with the mechanism herein described, by which the engineer can render the switch self-adjusting as the train approaches in opposite direction.

Second, I claim the levers, b b', the pinion, a'', the sector, d, shaft, c, and and crank, c', in combination with the levers, a a', pinion, a, sector, d', and the loose wheel, b'', on the shaft of the locomotive truck, all constructed, arranged, and operating substantially as described.

63,219.—CORN PLANTER.—A. M. Corbit, Bethlehem, Iowa

First, I claim the combination of the plate, K, with the plate, L, and set screw, M, for the purpose of regulating the amount of seed through the holes, c c, all made and operating substantially as herein shown and described.

Second, I claim the cross bars, D T and G, which are so made and provided with holes that the scrapers, E, plates, K, and seed boxes, H, may be moved more or less apart, so as to permit the planting of the corn in rows of suitable distances from each other, substantially as herein shown and described.

63,220.—MACHINE FOR SOLDERING METAL CANS.—Edward T. Covell, Brooklyn, N. Y.

I claim my improved soldering apparatus, consisting of a supporting plate, B, combined with a suitable soldering pad, A, constructed and arranged substantially in the manner and for the purpose herein set forth.

63,221.—AMALGAMATOR.—Francis W. Crosby, New York City.

I claim grinding or triturating pulverized ores when submerged in a bath of quicksilver or molten lead, substantially in the manner and for the purpose herein set forth.

I claim also the combination of one or more grinding plates or surfaces with the bottom of an ore supplying chamber and an enclosing bath of quicksilver or molten lead, substantially in the manner and for the purpose herein specified.

I claim also the combination of a hollow column or pillar, O, with the bottom of an amalgamating vessel, B, and an enclosing furnace, H, substantially in the manner and for the purpose herein set forth.

63,222.—COMBINED SHEEP HOLDER AND WOOL TYER.—A. M. Culver, Bedford, Ohio.

I claim the sides of the table, C' L, as arranged in combination with the strap, K', and lever, E, for the purpose and in the manner described.

Second, The arrangement of the sides, C L, and strap, K, in combination with the table, C', buckle, J, bar, H, and lever, I, as and for the purpose herein set forth.

63,223.—CARRIAGE.—John Curtis, Cincinnati, Ohio.

First, I claim the bent strip, B C D E, of elastic timber forming the sills of the body proper and to take the place of the spring bar and body loops, as and for the purpose set forth.

Second, The bent and rebated strip of timber, L L N N', discharging the functions of the double perch and of the upper member of the fifth wheel as set forth.

Third, The arrangement of strap, P, screw, Q, and gland R, to enable the members of a fifth wheel to be set up as they wear, in the manner explained.

Fourth, In the described combination with the elements of claim 3d, I claim the pad or cushion, S, for the purpose stated.

63,224.—ROLLERS FOR PULVERIZING SOIL AND CLODS.—John Cluster, Corsica, Ohio.

I claim the continuous single ring cutters, s s, secured by projections, a a, in grooves, c c, upon the periphery of the rollers, D D, arranged as and for the purposes herein described.

The cleaners or scrapers formed of a corrugated metal plate secured to the cross bar, F, with the corrugations or volutes, c c, placed between the cutters, s s, in the manner and for the purpose described.

63,225.—SPINNING BOBBINS.—J. Davis and S. W. Foster, Lowell, Mass.

We claim removing a portion of the lower end of the quill and slitting the end as shown at g, thereby forming the annular space, c, and the parts, d d, which act against the surface of the spindle, all substantially as and for the purpose set forth.

63,226.—STEAM GENERATOR.—R. W. Davis and D. Davis, Long Island City, N. Y.

First, We claim the arrangement, over the body of the boiler and within the smoke box, of a series or circle of superheating spheres, G, connected and applied to circulate or pass the steam received from the boiler successively through them, substantially as specified.

Second, The combination with a steam drying chamber or dome, E, of a series or circle of superheating spheres, G, both arranged within the smoke box of a vertical boiler for operation in connection with each other and with a steam generating space or chamber below, essentially as described.

Third, The combination with the smoke box and body of the boiler, of an inner and outer series of smoke tubes and combustion or heating chambers, the inner series having their draft contracted relatively to the outer series, essentially as and for the purposes herein set forth.

Fourth, The combination of the superheating spheres, G, arranged as described, smoke box, D, and outer row or series of smoke tubes, C, arranged relatively to the spheres, substantially as specified.

63,227.—AUTOMATIC BOILER FEEDER.—Henry O. Demarest, New York City.

I claim the oscillating chambers, C C', with apertures c c,' in combination with the scales, B B', apertures, d d', pipes, e g, and injector, b j k, all constructed and operating substantially as and for the purpose described.

63,228.—HAMMER.—Robert Devereaux, Buffalo, N. Y.

I claim attaching a hammer or analogous tool to its handle by means of the plate, A, when said plate is constructed and applied to the handle as described, in combination with the recess, d3, in the eye of the hammer to receive the plate, substantially as set forth.

63,229.—BURNING OIL.—Henry C. Dewitt, St. Louis, Mo.

I claim, First, The mixture formed from and by the action of the ingredients, A B C F H and I, substantially as described and as set forth.

Second, The mixture formed from and by the action of the ingredients, A B C D E F G H and I, substantially as set forth.

63,230.—LOCKS.—Walter Dickson, Albany, N. Y.

I claim, First, The arrangement of the tumbler, H, to operate within the hollow spindle, E, substantially as herein specified.

Second, The combination of the tumblers, H, within the hollow spindle and the key inserted into the end of the said spindle and penetrating into the end of the said tumbler, substantially as herein specified.

Third, The stump, G, arranged in connection with the bolt, C, and in relation with the hollow spindle and the tumbler, H, within the spindle, substantially as herein specified.

Fourth, The application to a lock of a key having its body formed of a true spiral twist like that of a screw auger with a matrix corresponding thereto formed within a movable block or blocks, the key passing through said matrix to act on the tumbler in the manner and for the purpose specified.

63,231.—CLOTHES PIN.—William M. Doty, New York City.

I claim the wire clothes pin, A, having the arms, a, doubled and secured thereto as at b, forming a loop, the arm, a, passing through said loop and resting upon cross piece, b' whereby any lateral movement is prevented, as herein set forth.

63,232.—SAWS.—J. E. Emerson, Trenton, N. J.

First, I claim the springs as shown at B or E, either as a part of the saw plate itself, or made separate and firmly attached and instead to the saw plate or cutter disk when used for holding the teeth or cutters as herein described.

Second, I claim the combination of the saw plate, and the spring as shown at B or E, when made separate from said plate with the tooth, C, when fitted and arranged substantially as described and for the purposes set forth.

63,233.—HOOP SKIRTS.—August Fellheimer, New York City.

I claim the looped ends to the hoops of the skirt, of that class hereinabove referred to and substantially as and for the purpose specified.

63,234.—HOOP SKIRT.—Lewis Fellheimer, New York City.

I claim the skirt with the lower hoops passing entirely around the skirt and the upper ones secured to the stay, a', and provided with the gathering b', attached to the waist band and having at its rear the trailing device, consisting of the bands, C, strings, d, and band, d', when all parts are combined and arranged in the manner herein represented and described.

63,235.—PUMPS.—Eli Flanegin and A. B. Smith, Pittsburgh, Pa.

We claim the floating weight, P, counter weight, Q, pinion pulley, N, rack bar, M, and balance weight, L, arranged and operating together, substantially as and for the purpose herein specified.

63,236.—MEAT SLICER.—Albert M. Force (assignor to himself and A. H. Vaugn), Norwich, Conn.

First, I claim the outwardly flaring bar, F, secured to the holder, A, operating in combination with the adjustable slotted knife, K, substantially as and for the purpose specified.

Second, The slicer, the parts of which consist of the handle, B, holder, A, outwardly flaring bar, F, slotted knife, K, set screw, b, set screws, i, substantially as described.

63,237.—HOT BLAST APPARATUS FOR FURNACE.—Job Froggett, Youngstown, Ohio.

I claim a hot blast arrangement whereby the air is heated by passing through cylinders which are connected together on the outside of the heating chamber, substantially as herein shown and described.

63,238.—EVENER FOR WHIFFLETREE, ETC.—Merritt Gally, Marion, N. Y.

I claim the body of the evener, A, with stops, E E', the projecting levers, C C', and pivoted bars, B B B' B', combined and constructed as herein set forth for the purposes mentioned.

63,239.—CAR COUPLING.—J. B. German, Walnut Hills, Ohio.

First, I claim the self releasing car coupling, composed of the draw head, A, reversely hooked bar, B, formed with shoulders, c c', the spring, D, and coupling pin, E, combined and adapted to operate in the manner set forth.

Second, The combination of the lever, F, hooked bar, B, spring, D, and coupling, pin, E, constructed and arranged to operate, substantially as set forth.

Third, The connecting bar, B, having reversely directed hooks, b b', and shoulders, c c', and capable of instant releasement when in direct line by withdrawal of the coupling pin, E, or by advance of the lever, F, or when out of direct line by the automatic action of the parts in the manner set forth.

63,240.—MELTING AND SMELTING FURNCE.—Jacob Green, Norristown, Pa.

First, I claim subjecting ores to the action of the products of combustion, in a furnace where the gases are confined under pressure, substantially as and for the purpose described.

Second, The combination with a smelting furnace of pipes through which currents of steam and air can be introduced among the products of combustion previous to the latter being brought into contact with the ore for the purpose specified.

Third, A blast pipe so arranged in respect to the hearth and the fireplace of a smelting furnace, as to direct the products of combustion in a blast on to the hearth for the purpose set forth.

Fourth, A chamber or chambers, H, through which the ore is admitted to the furnace, when the skid chambers are arranged in respect to the bed and to the fireplace, substantially as specified.

Fifth, The fireplace, D, bed, F, stack, G, inclined passage, H, with its openings, substantially as and for the purpose set forth.

Sixth, The combination of the two fireplaces, D D, stacks, G G, passages, H H, beds, F F, and basin, E, the whole being constructed and arranged substantially as specified.

63,241.—GLASS FURNACE.—Jacob Green, Norristown, Pa.

First, I claim subjecting the materials of which glass is to be formed, to the action of hot products of combustion under air pressure by blasts within a furnace as set forth.

Second, The combination of a glass furnace with pipes so arranged, that the blast of air and steam can be introduced among the products of combustion before the latter are brought into contact with the contents of the pots or crucibles for the purpose specified.

Third, The combination with a glass furnace of a blast pipe and openings so arranged as to direct the products of combustion around the pots, substantially as set forth.

Fourth, The within described furnace consisting of the walls, A A' B B' with their openings, the top, C, siege, a, and fireplace, E, the whole being constructed and arranged as described.

63,242.—LOCK FOR TRUNK, ETC.—Charles Gschwind and Charls Reichardt, Union Hill, N. J.

We claim the application to a lock of the dog, D, and its combination with the notched spring catch, B, and bolt, C, substantially as herein shown and described.

Second, We claim a lock which is so constructed that it can only be opened by reversing the position of the key, in the key hole, substantially as and for the purpose herein shown and described.

63,243.—MACHINERY FOR NICKING SCREWS.—N. B. Hadley Providence, R. I., assignor to The International Screw Company.

I claim uniting the spindle, D, with its driving power by means of the movable latch connection, c, or its equivalent arranged and operating substantially as described for the purpose specified.

63,244.—HORSE HAY FORK.—George W. Heath, Burlington Pa.

I claim in combination with the bars, A D and G, the curved handle, E and points or hukes, C, and F, when the same shall be constructed and operated substantially as shown.

63,245.—PASSENGER REGISTER.—William Helffricht, Philadelphia, Pa.

First, I claim the plates, h and h', arranged within the case respect to rollers, C C', and slit, y, in front of the case, substantially as described.

Second, The combination of the roller, C, with the spring, b, for the purpose described.

Third, The plate, E, with its transverse slot, f, arranged within the case respect to the rollers, C and C', as set forth for the purposes specified.

Fourth, The steadying and guiding pins, l l, secured to one portion of the case and adapted to holes in the other portion as and for the purpose herein set forth.

63,246.—COTTON CULTIVATOR. — Richard B. Henderson, Warren county, N. C.

First, I claim the frame, A, running on wheels, B, and operating in combination with the hoes, substantially as and for the purposes set forth.

Second, The crank, G, in combination with the handles, M, and hoes, N and O, substantially as and for the purposes set forth.

Third, The hoe, N, when constructed and operating substantially as and for the purposes set forth.

Fourth, The hoe, O, when constructed and operating substantially as and for the purposes set forth.

Fifth, The hoe, P, when constructed and operating substantially as and for the purposes set forth.

Sixth, The extension frame, H, when constructed and operating substantially as and for the purposes set forth.

Seventh, The cultivator, Q, in combination with the machine herein set forth.

63,247.—STEAM GANG PLOW.—W. H. Heydrick, Chesnut Hill, Pa.

First, I claim the shaft, k, rotated by the clutch connection or by hand, as desired and operating by means of a spiral series of cams, to elevate the plow consecutively from the ground, substantially as described.

Second, The shaft, o, rotated by the clutch connection or by hand as desired, and operating by a spiral series of cams, to trip the dogs or their equivalent consecutively to lower the plows to the ground, substantially as described.

Third, The combination with the cam shafts, k o, of the levers, g, and spring dog, i, operating substantially as described.

Fourth, The director wheel, b', shaft, a', and bar, z, constructed and operating substantially as described.

Fifth, The bar, a', supporting the cord pulleys and adjustable by devices, substantially as described.

63,248.—ELEVATOR.—Edward Hicks, North Hemstead, N. Y.

First, I claim the application and use of the movable side plates, h i, arranged and operating substantially as and for the purposes set forth.

Second, Supporting one truck of the car, so that it can rise and fall in respect to the car, substantially as and for the purposes set forth.

Third, The arrangement of the cross bar, k, or its equivalent for supporting the end of the car, substantially as and for the purposes set forth.

Fourth, The combination and arrangement of the pulley, f, and block, g, or their equivalent for elevating the bearing wheels, a b, and releasing the car, operating substantially as set forth.

Fifth, The combination and arrangement of the block, g, spool, d, and supporting brace, i', or their equivalents, for holding and releasing the fork and load, and operating substantially as set forth.

63,249.—MANUFACTURE OF LEAD FOIL COATED WITH TIN. Dauphin S. Hines, Brooklyn, N. Y. assignor to John J. Crooke, New York City.

I claim the process substantially as described for making foil of lead coated with tin on both sides by inserting a plug of lead within a pipe made of tin, and then rolling the compound ingot thus formed, as set forth.

63,250.—TOOL FOR CUTTING OFF BOILER TUBES.—Peter Hoffman, Jersey City, N. J.

I claim a tool for cutting boiler tubes which is composed of a split or sectional bar, A, provided at one end with a boss, a, and at the opposite end with teeth, c, to operate in combination with a wedge, B, substantially as and for the purpose set forth.

63,251.—HOISTING APPARATUS.—George L. and William M. Howland, Topsham, Me.

First, We claim the pawls, G and I, arms, g' and i' and links. i and J, in combination with the spring lever, H, bars, A and B, and lever, D, all made and operating substantially as herein shown and described.

Second, The pawl, m, in combination with the pawls, G and I, and with the bar, B, substantially as and for the purpose herein shown and described.

Third, The pin, l, and pawl, m, in combination with the band, n, arm, g, and spring, p, all made and operating substantially as set forth.

63,252.—CARRIAGE CLIP.—Elias Hoxir, Montezuma, N. Y.

First, I claim the joint when formed by bending the two external joint pieces, C C, on to the solid stand, D, as above set forth.

Second, In combination with the above, I claim the thill iron, A, when used as and for the purpose above described.

63,253.—SKIRT WIRE.—George W. Hubbell (assignor to himself, W. E. Houston, and J. R. Lattin), Birmingham, Conn.

I claim a cord or edge formed upon the wire from the same material with which the wire is covered, substantially as herein set forth.

63,254.—CONVERTING MOTION.—Wm. H. Hurlbut, Elgin, Ill.

I claim the spiral flanged cam, B, having its ends constructed as described, in combination with the cross head, A, and pins, a a, of a steam engine, or with an equivalent part of any other motor, and with the shaft, C, the whole being constructed, arranged, and operated substantially in the manner and for the purpose set forth.

63,255.—NON-CONDUCTING COMPOSITION FOR COVERING BOILERS, ICE HOUSES, ETC., TO IMPEDE THE PASSAGE OF HEAT.—John Allcock Jones, Middlesboro on Tees, England.

First, I claim the application and use, for the purpose of impeding the passage of heat or caloric, of peat, turf, bog, soil or, or other similar accumulations of vegetable, or partly vegetable and partly earthy matter, either alone or in combination with other ingredients, as hereinbefore described.

Second, The molding of the said material or composition into cakes and bricks, and the subsequent application of the same, in that form, for the purpose specified.

63,256.—MANUFACTURE OF VINEGAR.—Gerhard Kamps, Pittsburgh, Pa.

I claim the mode of manufacturing vinegar from any vegetable substance containing saccharine or farinaceous qualities, as herein specified.

63,257.—STEAM-ENGINE LUBRICATOR.—Heinrick Kessley Caub City, Duchy of Nassau.

I claim the combination and arrangement of the tube, C, vessel, N, net work in the tube, F, valves, D and E, and the spring, G, substantially in the manner and upon the principle, as herein set forth.

63,258.—PRESS.—David King, Aberdeen, Ohio.

First, I claim the rack, O, gear wheels, J and K, in combination with the screw shaft, I, and sash, G, substantially as shown and described, and for the purposes set forth.

Second, I claim the nut, P, made in sections, as herein shown and described, in combination with the shaft, I, sash, G, and posts, A and B, substantially as and for the purposes herein set forth.

63,259.—APPARATUS FOR DRYING STRAW BOARD, SHEETS OF PAPER, etc.—Robert T. Knight, Philadelphia, Pa.

First, I claim a chamber communicating with a fan or other blowing or exhausting apparatus, and having any desired number of bars, D D', or their equivalents, for the reception of detachable slats, F, or their equivalents.

Second, The construction and arrangement, substantially as described, of the lower slats, G, for the purpose specified.

63,260.—GANG PLOW.—H. P. Kynett, Lisbon, Iowa.

I claim the combination of the slotted cross piece, E, side piece, S, bolts, f, pendants, e, adjustable clevises, d, and beams, F, substantially as described for the purpose specified.

63,261.—MACHINE FOR POUNCING HATS.—John L. Labiaux, Newark, N. J., assignor to himself, C. Courtois, P. W. Vail, and Wm. C. Griswold, Newark, N. J., and N. B. Day and Julius Sheldon, New York City.

First, I claim the combination of the levers, e e', respectively with the shafts, E E', spiral spring, g g, block, G, or roller, H, substantially as and for the purposes herein shown and described.

Second, I claim the combination of the disks, C or C', and handle, I or I', with the pin, i, and flange, b or b', on the posts, B or B', all made and operating substantially as herein shown and described.

Third, I claim the combination of the metal pouncing roller, H, with the wedge, l, ring, m, and shaft, E', arranged to operate substantially as and for the purposes herein shown and described.

63,262.—DRILL SPRING FOR QUARRYING STONE, etc.—Ebenezer G. Lamson, Shelburne Falls, Mass.

First, I claim, in combination with stone drilling or quarrying machines, a metal bow spring and metal strap or cord for carrying and sustaining a drill, substantially as described.

Second, I also claim connecting the metal strap or cord of the spring to a central, divided, and adjustable head, substantially as and for the purpose described.

Third, I also claim the combination of the spring, strap, drill stock, and drill, substantially as and for the purpose described.

63,263.—EMBOSSING AND PERFORATING PAPER, etc.—Chas. Lang, New York City.

I claim the new mode of manufacturing embossed and perforated goods out of paper linen, cotton-lined paper, paper mixed with cotton threads or linen threads, cotton cloth, linen cloth, or similar material, by means of the machine, substantially as described, the rollers, two of which contain the design, depressed and raised, and the third acting, by its pressure, as perforator, between which said rollers a strip of paper or other material is passed, and is embossed, perforated, and cut during its passage, substantially for the purpose set forth.

63,264.—WATER EJECTOR.—Henry S. Lansdell, New York City.

First, I claim the arrangement of the two or more water inlet pipes or nozzles, m m, in relation with the nozzle, a, of the jet pipe and liquid-receiving chamber, substantially as and for the purpose specified.

Second, The combination with a steam siphon or ejector of an escape valve, p, applied to the jet pipe, G, for operation, substantially in the manner and for the purpose specified.

63,265.—MACHINE FOR MAKING PAPER ALLUMETTES.—B. B. Lehman, Lebanon, Pa.

First, I claim the circular saw or cutter, B, having knife-edged teeth operating substantially as and for the purpose herein described.

Second, In combination with the above, I claim the carrier, F, substantially as and for the purpose herein specified.

Third, I claim the creasing or pressing rollers, operating substantially as and for the purpose herein set forth.

Fourth, I claim the folder, D, in combination with the creasing and pressing rollers, substantially as and for the purpose herein set forth.

Fifth, I also claim the inclined plane, H, operating substantially as and for the purpose herein specified.

63,266.—PULLEY FOR BELTING.—Moses Lewis and Samuel Miller, Greenville, Conn.

We claim the tapering or conical pulleys, B E, over which the twisted belt, F, circulates, arranged on shafts, A D, at right angles to each other, for the purpose described, in the manner specified.

63,267.—CHEESE BOX.—Nathaniel and Friend Lewis, Adams, N. Y.

We claim as a new article of manufacture a cheese box constructed of paper provided with a removable head, B', and a head, B, permanently secured to the laps, C, which are made in one piece with the side of the box, and secured between disks, D, substantially as described.

63,268.—BOAT-DETACHING TACKLE.—Johann A. Libbertz, Hamburg, Germany.

I claim the vertical shaft, H, provided with the nut, J, lever, I, and the slide, K, having lateral arms, d d, in combination with the arms, G G, pivoted in the ears or lugs, F F, on the plate, E, all arranged to operate in the manner substantially as and for the purposes set forth.

63,269.—LINIMENT.—John S. Lightner, Westford, Wis.

I claim the liniment compounded as above set forth and described.

63,270.—WIRE-POINTING MACHINE.—John Lockwood, Wilton, Conn., assignor to himself and Edwin Gilbert, Redding, Conn.

I claim the improved wire-pointing machine herein described, consisting of the frame shaft pulley, cutter head, and cutter, all constructed, arranged, and operating substantially as described.

63,271.—KEY.—C. E. Lombard (assignor to himself, A. O. Sinclair, and C. C. Merritt), Springfield, Mass.

I claim as a new article of manufacture a key formed of two parts, A and B, constructed and arranged so that the handle, B, shall close over the opening in the shaft, A, substantially as set forth.

63,272.—CLOTHES WRINGER.—David Lyman, Middlefield, Conn.

First, I claim in clothes wringers the within-described construction and arrangement of the grooves, M N, and intermediate piece, E X Y, combined and arranged relatively to the shafts, B A and D, so as to communicate the motion and withstand the wear, substantially in the manner and for the purpose herein set forth.

Second, I claim the piece, C C', constructed and arranged as represented, to hold both the shafts, A and B, so as to transmit the motion as represented and to maintain the shafts at a uniform distance apart however which the other parts may move relatively thereto, substantially in the manner and for the purpose herein specified.

63,273.—CLOTHES WRINGER.—David Lyman, Middlefield, Conn.

First, I claim in combination with the shafts, c d, cranks, c' d', and connecting rod, G G', or swiveling guide, H, operated so as to retain the central position, closing the greater or less divergence of the shafts, substantially as and for the purpose herein set forth.

Second, I claim in a clothes wringer having diverging jaws, a spring operating on both pairs of jaws and acting as both spring and brace therefor, substantially as herein set forth.

Third, I claim in a clothes wringing machine, substantially as herein described, the gripping arm, L, and spring, K, operating substantially as herein set forth.

63,274.—TABLE-LEAF SUPPORT.—John A. MacKinnon, Reading Pa.

I claim the straight levers, A, hinged at one end and notched at the other, when constructed, combined, arranged, and operated by the lever catch, G, spiral spring, H, and button, K, as herein described and for the purposes set forth.

63,275.—METAL CASE FOR SPRING BOLTS.—Eli J. Manville, Waterbury, Conn., assignor to Turner, Seymour & Judds, Wolcottville, Conn.

I claim the combination of the mandrel, a, and dies, b c d and e, to which movements are communicated in substantially the manner specified for bending up a sheet-metal case with flanges at its ends, as set forth.

63,276.—PLOW.—Seth March, Norfolk, Va.

I claim the frame, the mold board, the heel, D, and the weeder, substantially as described.

63,277.—CAR COUPLING.—Arthur McCarter, Lancaster, Pa.

I claim the combination and arrangement of the slotted casing, A, with its vertical standards, B B', cross arm, d, of pin, C, when operating in a vertical slot, D, with a terminal recess, D', together with a stationary or yielding stand post, F, with its link notch, g, all arranged and operating in the manner and for the purpose specified.

I also claim the cross arm, d, on the pin, C, in combination with the upright standards, B B', when slotted in the manner and for the purpose shown.

I also claim the yielding stand post, F, with its link slot, in combination with the coiled spring, H, constructed and operating in the manner shown, for the purpose described.

I also claim the prolongation or jaws, E', of the flared mouth, E, in combination with the open case, A, when constructed in the manner and for the purpose shown and set forth.

63,278.—SWING.—John A. McClain, Philadelphia, Pa.

First, I claim the vibrating frame, P O O' P, and springs, S S', whether metallic or otherwise, when constructed and combined in the manner and for the purpose above described and set forth.

Second, The combination of upright, A A, and vibrating frame, P O O' P, rope and foot board, R and F, springs, S' S', and suspenders and seat, S P and S, the whole combined and constructed for the purpose in the manner aforesaid described and set forth.

63,279.—MACHINE FOR MAKING FRUIT BASKETS.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the cutter, H, constructed substantially in the manner and for the purpose above specified.

Second, I claim the hollow cylinder, C, in combination with the main cutter, H, arranged to operate substantially in the manner and for the purpose above set forth.

Third, I claim the head cutter, I, when in combination with the main cutter, H, substantially in the manner and for the purpose above described.

Fourth, I claim revolving a log against a cutter or cutters arranged to move gradually in a direction parallel to its axis, for the purpose of cutting a helical coil suitable to be divided into pieces that, when sprung from their helical form to a circular one and properly fastened, they will constitute fruit baskets, pots, or bowls with the bottoms on, substantially in the manner as above described.

63,280.—MACHINERY FOR CUTTING THE BOTTOM OF FRUIT BASKETS.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the grooving cutter, C, so mounted on the quadrant or plate, C, on the head, B, that it may be moved inward thereon and produce an undercut groove adapted to receive and hold the properly formed material driven therein, substantially in the manner and for the purpose herein set forth.

Second, I claim the rod, E, in combination with the hollow arbor, A, and the surface, D, adapted to operate the plate, C, with its cutters, C1 C2 C3, and move it inward when required, substantially in the manner and for the purpose herein set forth.

63,281.—STEAM ENGINE.—J. V. Merrick, Philadelphia, Pa.

First, The combination of the annular cylinder, A, its piston, E, two or more piston rods, m m, plate, or cross head, K, rods, n n, cross head, G, connecting rod, l, and crank, h, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the above with rods, m' m', for the purpose specified.

63,282.—CHURN.—Daniel E. Merrill, South Paris, Me.

First, I claim making the horizontal arm, d', of the standard, D, adjustable so that it may be extended or contracted, substantially as herein shown and described and for the purpose set forth.

Second, The combination of an adjustable slide or socket, J, with the balance wheel, G, for the reception of the end of the arm, K, adjustably attached to the dasher handle, E, substantially as herein shown and described and for the purpose set forth.

Third, Combining an air pump, m, with the churn, A, in such a way that the discharging pipe, m', of said pump may enter the churn through the middle part of its bottom, substantially as herein shown and described.

63,283.—PAINT CAN.—Hermann Miller, Hoboken, N. J.

I claim a wooden cover, B, which is screwed to the paint can, A, for the purpose of easily opening and reclosing the same, substantially as herein shown and described.

63,284.—STREET CROSSING AND SEWER INLET.—Joseph A. Miller, New York City.

First, I claim the arrangement of a trough the bottom of which slopes down from its ends toward the middle, in combination with a street crossing made of perforated plates of metal or other suitable material and with a pipe extending from the lowest part of the trough down into the sewer, substantially as and for the purpose described.

Second, The sewer inlets, b, and aprons, c, at the ends of the trough, B, in combination with pipe, C, extending from the lowest portion of the trough down in the the sewer, D, substantially as and for the purpose set forth.

Third, The application of the stench trap, E, in combination with the pipe, C, sewer, D, trough, B, and crossing, A, all constructed and operating substantially as and for the purpose described.

63,285.—PACKING FOR PISTON RODS.—Wm. H. Miller, Philadelphia, Pa.

I claim a new manufacture consisting of packing composed of a filling of fibrous or other materials covered with cotton, woolen, or other yarn, saturated with powdered soapstone or equivalent material and wound around the filling, substantially as shown and described.

63,286.—PORTABLE BOILER FOR PITCH, ETC.—Luke S. Mills, Brooklyn, N. Y.

First, I claim a portable boiler formed with an arched fire chamber, and an exterior shell contracted toward the top and for the purposes specified.

Second, I claim a portable boiler formed with sides to set down upon the earth or pavement, as arched fire chamber provided with doors at the ends, a smoke pipe or flue passing off from the top of the fire chamber through the boiler, and a movable cover to give access to the contents of the boiler, substantially as set forth.

Third, In combination with a portable boiler formed as aforesaid, I claim the jacket of felt, and cover, l, as set forth.

63,287.—HEATING STOVE.—Geo. R. Moore, Lyons, Iowa.

First, I claim the insulation of the tops of heating stoves, substantially in the manner and for the purposes set forth.

Second, The chamber in the front part of the stove between the door, E, and upper part of plate, H, when constructed and arranged as and for the purposes set forth.

Third, The flue from the fire chamber through the front upper chamber to chamber in top of the stove, with the controlling dampers, arranged substantially as and for the purpose set forth.

63,288.—FARM GATE.—D. S. Neal (assignor to himself and J. B. Blood), Lynn, Mass.

I claim a rectangular gate the bars of which are relatively fixed, hung, and operated as described, by supporting it upon a pin, c, and guiding, A, in its vertical swinging movements by means of the vertical slot in the upright, substantially as set forth.

63,289.—SHIP'S DAVIT AND WINCH.—D. P. Nickerson, Cleveland, Ohio.

I claim the adjustable sliding davit, A, pinions, C, as arranged in combination with the adjustable shaft, D, clutch, E, and winch, H, for the purpose and in the manner substantially as set forth.

63,290.—FIELD FENCE.—A. W. Olds, Green Oak, Mich.

I claim the posts or stakes, A A, base, B, in combination with the braces, C C, and tie, E, when arranged in relation to each other and the rails, D, as and for the purpose set forth.

63,291.—SAFETY ATTACHMENT FOR POCKET BOOKS.—Simon B. Parker, New York City.

I claim a safety attachment for pocket books, composed of a sliding needle, C, arranged and applied substantially in the manner as herein shown and described.

63,292.—BOOTJACK.—Walter S. Piffer, Carlisle, Pa.

I claim a bootjack with the two parts hinged together at F, and the part, B N, provided with a movable toe piece, D, acted on by any suitable spring, substantially as specified within.

63,293.—WATER-TIGHT IRON TANK FOR THE PROTECTION OF THE TIMBERS OF STEAM BOATS.—Abraham G. Polhamens, Nyack, N. Y.

I claim the construction of the water-tight iron tanks in which are maintained a constant change and circulation of water as the foundation of boilers and furnaces on steam boats, to protect them against fire, substantially as herein described.

63,294.—MOP SQUEEZER.—E. P. Porter, Morrisville, Vt.

I claim the jaws, D, lever, H, and treadle, J, arranged and operated as herein described in combination with the movable platform, B, for the purpose set forth.

63,295.—DOOR LOCK.—E. D. Porter and G. W. Hallett, Waterford, N. Y.

First, We claim the spring catches, H, whether more or less in number in combination with the bolt, B, when arranged together substantially as and for the purpose described.

Second, The catch, K, in combination with the bolt, B, substantially as and for the purpose specified.

63,296.—FENCE.—Aaron W. Pratt, Pulmeyville, N. Y.

I claim the sill, E, the posts, A, the cap, d, the pales, b, and the wire strands c, the whole arranged constructed and operating substantially as herein described.

63,297.—BRIDLE BIT.—Joshua C. Price, New Philadelphia, Ohio.

I claim the movable or sliding levers or sides, B B, when applied substantially as and for the purpose set forth and described.

63,298.—COMPOSITION FOR DESTROYING INSECTS.—Daniel R. Prindle, East Bethany, N. Y.

I claim the composition of coal tar and petroleum, in the manner and for the purpose herein specified

63,299.—HYDRAULIC PAINT.—Daniel R. Prindle, East Bethany, N. Y.

I claim a paint composed of pulverized hydraulic lime and skim milk either with or without the addition of chrome, yellow, or other pigment, as herein specified.

In combination with the above I also claim the use of linseed flour, as set forth.

63,300.—PROCESS OF PRESERVING WOOD AND TIMBER.—Daniel R. Prindle, East Bethany, N. Y.

I claim the application of coal tar, common tar, or equivalent substance, or the ingredient thereof, to wood and timber successively, substantially as specified, as a new process of preserving the same.

63,301.—IRONING MACHINE.—P. O'Thayne, New York City.

First, I claim the construction and arrangement upon the frame, A, of the cylindrical revolving smoothing iron, D, hollow shaft, B, having its bearings in the yielding boxes, a, which are provided with the standards, c, adjustable rest, e, forked lever, E, rod, d, and treadle, F, substantially as herein shown and described.

Second, The segmental platform, G, upon the end of the shaft, H, provided with the clamps, g g, flatboard, G', having the toothed rack, i, pinion, J, mounted upon the shaft, i, when all are constructed and arranged upon the frame, A, as and for the purpose specified.

63,302.—WATER GATE.—Henry Recher, Liberty, Ohio.

I claim the arrangement and combination of the centrally-hinged gate, F, with the connecting rod, E', lever, C, and float, B, all constructed and operated substantially as described.

63,303.—BREECH-LOADING FIRE-ARM.—Thomas Restell, London, England, assignor to Charles Pomeroy Button, New York City, Antedated March 13, 1867.

I claim the reciprocating hammer, H, with its curved inclined plane, S, and spring lever, G, in combination with the sleeve, C, and tube, E, for operating the needle, d, substantially as described for the purpose specified.

63,304.—LEMON SQUEEZER.—August J. T. Reuter, Boston, Mass. Antedated March 18, 1867.

I claim a grooved bulb or knob constructed substantially as above set forth for the purposes herein specified.

63,305.—SAFE LOCK.—John R. Richards (assignor to himself and A. L. Mennez), Mount Joy, Pa.

First, I claim the twin sand boxes, A A', or their equivalent gravitating force, and regulating key, H, for timing the period that shall intervene before the bolt, D, and bolts, W, can be operated so as to unlock the door by withdrawing or unscrewing them by simply turning the knob, F, substantially in the manner and for the purpose specified.

Second, The socket, screw bolts, W D, operated substantially in the manner and for the purpose specified.

63,306.—SASH FASTENER.—Orville M. Ridgway, La Porte, Ind.

I claim the combination of the metallic spring, C, rubber block, D, when constructed and arranged upon each of the sashes, B, as herein set forth, for the purpose specified.

63,307.—LEATHER SCOURING MACHINE.—A. W. Roberts (assignor to P. Jewell & Sons), Hartford, Conn.

First, I claim the rotating plate, T, sliding plate, T', guide way, T'', or their equivalents, in combination with the table, S', to produce a transverse movement of the table with the guide ways, B'', substantially as described.

Second, In combination with the above I claim the table, S, to produce a universal horizontal movement of said table, substantially as described.

Third, I claim the employment of an oscillating, adjustable tool holder with the arms, H', for altering the angle of the tool, substantially as described.

Fourth, I claim the altering of the angle of the tool, with or without the use of the tool arms, H', by means of the adjustable shaft, H, or its equivalent, substantially as described.

Fifth, I claim the employment of the springs, K, secured to the arms, H', and bearing upon the tool holders, I, extending in an opposite direction from that to which the springs are secured, for the purpose of imparting pressure from one to the other, substantially as shown and described.

Sixth, I claim the alternate action of the springs, K, imparted from one to the other by raising either one of the arms from the table, substantially as described.

Seventh, I claim the arms, G G, in combination with the arms, F' F', arms, E, rock shafts, F F, and their connections, for lifting the tools from the table, substantially as shown and described.

Eighth, I claim arranging the arms, H', upon an independent shaft, H, to more perfectly utilize their action.

Ninth, I claim arranging the shaft, H, in adjustable or sliding boxes, A'', whereby it can be elevated or depressed by screws, c c, or their equivalents, for the purpose as shown and described.

Tenth, I claim the employment of slide dogs, F'', or their equivalents, for holding up the tools from the work while the tool stock, C, is in motion.

Eleventh, I claim the employment of the screw c'', with the arm, D, or their equivalents, for increasing the tension of the spring, K, substantially as described.

63,308.—TOOL HANDLE.—Wm. Runte, New York City.

I claim the combination of the plug, D, and the adjustable ferrule or tube, E, with the tool handle, substantially as and for the purpose herein shown and described.

63,309.—WAGON.—Benj. Ryder, Jr., South Covington, Me.

I claim the frame, G, which supports the reach and allows the wheels to be extended forward, substantially as described.

I claim the rollers, C D, and the chain, h, arranged and operating substantially as shown and described, for the purposes specified, in combination with the wagon body.

63,310.—TOBACCO PIPE.—Louis Saarbach, Philadelphia, Pa.

I claim the tube, c, in combination with the cup, D, for the purpose described.

63,311.—FIRE-PROOF SAFE.—Rufus S. Sanborn, Ripon, Wis.

First, I claim introducing water vessels provided with steam valves into a fire-proof safe of any ordinary construction, said vessels being of such size and conformation as to adopt them to the form and dimensions of the safe in which they are placed.

Second, Providing each of such water vessels with a tube, t, reaching from any portion of the edge or perimeter to or toward the mathematical center of the vessel, as and for the purpose specified.

63,312.—WAGON BRAKE.—B. B. Scofield, Woodhull, Ill.

I claim an improved brake formed by the combination of the revolving cylinder, A, curved shoes, C, and lever, D, with each other, substantially as herein shown and described and for the purpose set forth.

63,313.—BED BOTTOM SPRING.—H. G. Seekins (assignor to himself Leonard B. Griffing, and Orange S. Frary), Elyria, Ohio.

I claim a compound bed spring consisting of the middle leaves, A H' the upper leaves, B B', and lower leaves, C C', the several springs being supported by the fulcrum blocks, d d', constructed and arranged as and for the purpose specified.

63,314.—SOAP COMPOUND FOR CLEANING AND SCOURING WOOL, SILK, ETC.—Daniel Shattuck, Buffalo, N. Y.

I claim a soap formed by the combination of the ingredients above described, substantially in the manner and proportions specified.

63,315.—FOLDING SEAT.—C. W. Sherwood, Chicago, Ill.

I claim the rubber spring, e, or its equivalent, and the lug, d, in combination with the axle, C, and nave, B', all constructed substantially as and for the purposes specified.

63,316.—FLOUR SIFTER.—J. A. Sinclair (assignor to himself and J. T. Judkins, and W. Hollister, Woodafield, Ohio.

First, I claim the combination of the two cylinders, H and I, having lines of brushes, M, winding spirally around them in opposite directions with sliding drawers, E, substantially as herein shown and described for the purpose set forth.

Second, The drawer, E, consisting of two hinged parts, e1 and e2, with opening on its upper side, registering with the discharge orifice of the hopper having at its bottom the semi-cylindrical sieve, G, swept by the spiral brushes, M, and a passage at its rear opening into spout, N, and constructed and operating substantially as described for the purpose specified.

Third, The combination of the sliding drawer, E, with the box, A, hopper, B, and spout, N, substantially as herein shown and described.

63,317.—WINDOW BLIND FASTENING.—Thomas J. Sloan assignor to Ezra Gildersleeve, New York City.

First, I claim the hinge having bevel cogs in combination with the shaft extending to the inside of the window provided with a bevel cog wheel, and the hinge shank constituting the hinge journal on which the blind turns, and the box in which the shaft turns, substantially as and for the purpose described.

Second, The combination of the hinge with its beveled cogs, the shaft with its beveled cog wheel, the spring spur on the knob and the plate or its equivalent, with a recess to receive the spur to lock the blind when either shut or open, substantially as described.

Third, The beveled recesses in the face of the locking plate, or the equivalent thereof, for holding the blind or shutter at any angle desired, in combination with the spring spur, the shaft and hinge connected by bevel gears, substantially as described.

63,316.—SELF-ACTING GATE.—Albert C. Smith, Fort Madison, Iowa.

I claim the combination and arrangement of the gate, A, lever, E, and rods, b d, and operated by the levers, H H', with their cords, r s, rod, g, and pulleys, in the manner substantially as described and for the purposes set forth.

63,319.—DRILLING APPARATUS.—J. T. Smith, Pittsburg, Pa.

First, I claim automatically feeding a drill by means of the sheaves, a and b, having motion imparted to them, substantially as described.

Second, I claim the adjustable sheaves, a, in combination with the non-adjustable sheaves, b, when arranged to operate as set forth, for the purpose of holding the rope, R, and feeding it out as described.

Third, I claim the combination of the shaft, E, provided with the wheel, m, and worm wheels, H, with wheels, D, attached to the journals of sheaves, a, all mounted in the rotating frame, A, and arranged to be operated as set forth.

Fourth, I claim the use of the within-described apparatus for feeding drills whether the same be rotated by the twist imparted to the rope, or by means of the ratchet, I, substantially as described.

63,320.—RICE HULLING MACHINE.—D. H. Southworth, New York City.

I claim the conical drum, D, provided with a series of teeth or pins, g, and elastic plates and rubbers, F F', on its periphery, arranged and operating essentially as specified.

63,321.—LANTERN.—Charles F. Spencer, Rochester, N. Y., assignor to himself and Charles W. Barker.

First, I claim resting the globe, C, with the top, E, attached thereto, loosely in the open-topped guards, B, so as to be raised and dropped at pleasure, as herein set forth.

Second, Constructing the lantern with closed base and open-topped guards, for the insertion of both the lamps and globe through the top, as herein specified.

Third, The enlarged wheel, c, so situated and arranged as to reach above the top of the base to be easily operated by the finger, as herein set forth.

63,322.—RIDING SADDLE.—Samuel S. Spurgin, Jacksonville, Ill.

I claim the arrangement in the saddle of the springs, G G, supported on the side plates, and the elastic straining piece, H, fastened to the springs and to the pommel and cantle respectively, substantially as described.

63,323.—BREAST PROTECTOR.—John Stadermann and Henry Sauerbier, New York City.

We claim the two wire gauze or wire cloth parts, A A, swaged each with a protuberance, a, and in such a form as to admit of being inserted in or attached to the garment, substantially as and for the purpose set forth.

We also claim the connecting of said parts together by hooks and eyes, slides elastic or other fastening, which will admit of said parts, being connected and disconnected with facility, and still keep the parts in proper position, substantially as described.

63,324.—PAVEMENT.—C. W. Stafford, Saybrook, Conn.

I claim connecting and securing the sections of the pavement together by means of the staples or clamps, a, over pins or keys, b, passing through horizontal slots in the vertical flanges, substantially as herein shown and described.

63,325.—RESERVOIR FOR COOLING GRAIN AND FLOUR.—Henry Stanley, St. Johnsbury, Vt.

I claim a reservoir for cooling grain or flour when constructed by placing the posts thereof in zig-zag position, and surrounding them with wire gauze or other porous material, thus forming air recesses, a a, upon the outside of the body of the grain or flour, increasing the surface of the grain exposed to the air, substantially as described and for the purpose specified.

63,326.—APPARATUS FOR CARBURETTING GAS AND AIR.—John S. Stephenson, Cleveland, Ohio.

I claim the combination of the tubes, H and T, with the agitating wheel, A, and fan wheel, N, and funnel pipe, F, constructed as described, and arranged to operate in the manner set forth.

63,327.—DRYING HOUSE AND OVEN.—David Stouter, Dayton, Ohio.

First, I claim the metallic oven, A, when the lower part is constructed with double walls, and the upper part is lined with wood in the manner substantially as described, and for the purpose specified.

Second, The air chamber, O, when arranged with reference to the furnace, F, and oven, A, in the manner substantially as described, and for the purpose specified.

63,328.—VITREOGRAPHY.—C. C. Stremme, Austin, Texas.

I claim the mode of ornamenting glass as herein described, by the application of glue or similar adhesive and contracting matter, and in this manner produce mosaic for casting all and every kind of ornamental glass wood glassware, and for all of which I pray that letters patent may be granted me.

63,329.—RUNNER FOR CHAINS.—W. H. Stroup, Pittsburgh, Pa.

First, I claim an improved runner, having adjustable fastenings attached to its upper edge, substantially as herein shown and described, and for the purpose set forth.

Second, Making one of the fastenings adjustable longitudinally, substantially as herein shown and described, and for the purpose set forth.

63,330.—SPRING FOR VEHICLE.—James B. Stuart, Bunker Hill, Ill.

I claim the constructing of a side spring for wheel vehicles of three parts, D D C, connected together and applied to a spring bar, A, substantially in the manner as shown and described.

I further claim the securing or holding of the leaves of the parts, D D C, in contact, by means of clips or collars, c c, substantially as set forth.

63,331.—APPARATUS FOR PREPARING MASH FOR BREWERS AND DISTILLERS.—Abram S. Swartz (assignor to himself and W. A. Case), Buffalo, N. Y.

First, I claim the combination of the air pump, H, and conducting pipe, F, with the hollow shaft, C, and perforated rake head, E, for the purposes and substantially as described.

Second, The combination of the receiver, G, and cooler, M, with the conducting pipe, F, hollow shaft, C, perforated rake head, E, and air pump, H, for the purposes, and substantially as set forth.

Third, In an apparatus for preparing mash for brewing, I claim the combination and arrangement of the receiver, G, steampipe, O, and steam and air pipe, N, for the purposes, and substantially as described.

Fourth, The sifting frame, V, in combination with the clutches, T and U, and bevel wheels, R and S, for the purpose and substantially as described.

63,332.—HAY LOADER.—Eli Sweet, Whitney's Point, N. Y.

I claim the arrangement of the sheave in the sliding tongue, and moving therewith, the rope passing over said sheave, and connected at its respective ends to the fork and to the brake bar on the tongue hounds.

63,333.—BRICK MACHINE.—Porter L. Sword, Adrian, Mich.

First, I claim the adjustable knife when constructed with a cutting edge set opposite to and so near the press plate, H', that there is merely room for the shaving of clay to rise between them, and having a cutting edge and elongated horizontal blade adjustably attached to both ends to and below the bed plate, H, and resting upon the revolving mold wheel, S, so as to perform the double function of cutting off the superfluous clay, and smoothing the upper surface of the brick, substantially as described.

Second, So suspending the rod, O, sustaining the wheel, N and L, that they may be independently adjusted at both ends, substantially as and for the purpose set forth.

Third, The combination of the bed plate, H, and stationary shaft, U, with the rods, M and O, wheels, N and L, collar, Q, bolts, Q, mold wheel, S, substantially as and for the purpose set forth.

Fourth, The arrangement in a brick machine of a stationary shaft, H, mold wheel, S, revolving around the same, and having gearing upon its periphery, and the driving spur pinion, R, substantially as set forth.

63,334.—SPIRIT METER AND SEPARATOR.—Isaac P. Tice, New York City.

First, I claim the receiver, B provided with a locked or sealed transparent cap or cover, C, when used in connection with a branch pipe, H, communicating with the receiver, the worm, A, and air discharge openings, substantially as and for the purpose set forth.

Second, A tilting or partially rotating meter, R, arranged with or applied to a scale frame, Q, to operate substantially in the manner as and for the purpose specified.

Third, A valve, M, connected with and operated by the scale frame, Q, when used in connection with the meter, R, and arranged to work, conjointly therewith, substantially as shown and described.

Fourth, The pin, n, on upright, a, in combination with the notches, m m', in the circular end of the meter, R, for the purpose of holding the meter in position while being filled, as set forth.

Fifth, The pin, k, on upright, a², in combination with the pins, l l', on the end of the meter, to serve as steps to determine the quarter revolution of the meter as set forth.

Sixth, The many chambered or four way cock, W, arranged in connection with sample chambers, q, q', q', and operated from the meter, or other movable part of the device, for the purpose specified.

Seventh, The weight or counterpoise, j, applied to the meter, R, in combination with the scale frame, Q, as shown and described.

Eighth, The adjustable spouts, U B², connected by a bar, E', or its equivalent, so as to be operated simultaneously as shown and described.

Ninth, I claim discharging the air from a still into a receiver, having a sinuous passage, substantially as shown in cover, K, for the egress and ingress of air as set forth.

Tenth, A locked or sealed cock, D', when used in combination with a meter, R, for the purpose specified.

Eleventh, The combination of the pipe or end, A, of the worm, with the receiver, B, and pipe, H, substantially as described.

Twelfth, The wiper or plunger, E, within the transparent cap cover or cylinder, C, arranged substantially as and for the purpose specified.

Thirteenth, The alarm composed of the wheel, I, and the spring or click, J, or their equivalents, when arranged so as to be operated by the air or gaseous vapor or contents of the still, substantially as shown and described.

Fourteenth, A case, C², constructed with double walls, or in any other manner, when said case is used with or incloses a meter, for the purpose of preventing the freezing of the contents of the same, as set forth.

Fifteenth, A meter in combination with a sealed transparent receiver, substantially as and for the purpose specified.

Sixteenth, The combination of a meter transparent receiver and a locked or sealed cock, for the purpose specified.

Seventeenth, The adjustable spout, U, in combination with the cock, W, substantially as and for the purpose set forth.

63,335.—SPIRIT METER OR SEPARATOR.—Isaac P. Tice, New York City.

First, I claim a revolving or tilting meter, hung or suspended on journals or pivots, i, and divided into two compartments, m m', by a diagonal partition or diaphragm, n, with discharge openings, o, all arranged substantially as herein shown and described.

Second, The floats, N, placed within the compartments, m m', of the meter, and arranged to operate a valve, O, to regulate the supply or flow of whisky to the meter, substantially as set forth.

Third, The placing of the journals or pivots, i, of the meter, within oblong boxes, k, having springs, l, at their ends, substantially as and for the purpose specified.

Fourth, Separating the high from the low grade whisky or spirits, by means of a hydrometer arranged with suitable mechanism in such a manner that the turning or tilting of the meter or other motor will transmit power through the intervention of a wheel stud or other device carried by the hydrometer to suitable mechanism, which will effect a diversion of the flow or discharge of the whisky or spirits into different receivers, according to its grade or strength.

Fifth, The employment or use of indicators or clock movements, in connection with the separating mechanism, substantially as and for the purpose specified.

Sixth, The hand, G, of paper or other material, in connection with a hydrometer, and separating mechanism, substantially as and for the purpose set forth.

Seventh, In spirit meters charging the paper which receives the record with preservative composition, substantially as described.

63,336.—METER ATTACHMENT FOR STILLS.—Isaac P. Tice, New York City.

I claim the combination of a plurality of meters, with a still to operate in the manner substantially as and for the purpose herein set forth.

63,337.—RAILWAY SWITCH.—James Tillinghast, Buffalo, N. Y.

I claim a triple switch for railroads, composed of the rails, D D' E E', connected respectively by the cross bars, a b, with the cross bar, G, applied to the rails, D D', through the medium of the oblong slots, c c, and pivots, c', and connected to the lower bar, H, by the spring, I, and the bars, c c, connected by the spring, F, and attached to the switch rails, D D', all arranged to operate substantially in the manner as set forth.

63,338.—DRILL FOR WELL.—Washington Tingley, New York City.

I claim in combination, the z-shaped cutting surface, composed of the parts, n l l, and the curved reaming cutters, m, whose edges on alternate sides are made oblique, so as to effect a drawing cut on the sides of the box, substantially as shown.

63,339.—MANUFACTURE OF RAILROAD TIES, BRIDGES, BUILDINGS, WHARVES, FENCES, AND OTHER ARTICLES OF GALVANIZED IRON.—Samuel P. Townsend, New Providence, N. J.

First, I claim a new article of manufacture for railroad ties, sills, foundations, structures in water, fences and buildings, fortifications, steps for stoops, piazzas, galvanizing sheathing for bottoms of vessels, ships, steamers, boats, etc., and the like, made of the materials and in the manner herein described, or any other substantially the same, and also for the galvanizing and preservation of railroad car wheels, axles, and machinery.

Second, The preservation of iron from oxydation or corrosion, by galvanizing it as above described, when used for the purposes herein mentioned.

63,340.—SAW MILL.—James Tracy, Brewer's Village, Maine.

I claim applying the spring, k, to bent lever, K, for the purpose of throwing the friction pulleys out of contact, substantially as described.

63,341.—ENDLESS BELT FOR POLISHING.—Justus A. Trant, New Britain, Conn., assignor to himself and Jeremy W. Bliss, Hartford, Conn.

I claim, as a new improved article of manufacture, an endless fabric rubber polishing belt, substantially as described.

63,342.—PEAT MACHINE.—Thomas J. Wells, St. Anthony, Minn.

I claim the conical grinding plates, F F', rotating at different speeds, and inclosed within a case, G, provided with a discharge spout, H, substantially as and for the purpose set forth.

I further claim the reciprocating mold box, I, provided with the molds, b b, and the plungers, J J, operated substantially as shown in combination with the rotating conical grinding plates, F F, inclosed within the case, G, provided with the spout, H, all arranged substantially as and for the purpose set forth.

63,343.—FAN WHEEL BLOWER.—Amos Westcott, Syracuse, N. Y. Antedated March 15, 1867.

I claim a fan wheel blower, propelled by friction wheels, as shown and inclosed within the parts, A J B, constructed and made adjustable, substantially in the manner described.

63,344.—DEVICE FOR HOLDING HORSES.—James M. Whiting, Providence, R. I.

First, I claim combining with the wheel of a carriage a hitching apparatus arranged in such manner that the winding up or shortening of the reins or other checking device shall take place only during the forward movement of the wheel, the said apparatus being disconnected from the driving gear during the backward movement of the carriage, substantially as shown and set forth.

Second, The combination with the windlass provided with a ratchet wheel as described, of a driving pinion loosely mounted upon said shaft, and carrying a pawl engaging with the said ratchet wheel, under such an arrangement that the said shaft shall be disconnected from the driving gear during the backward movement of the carriage, as set forth.

63,345.—HORSE HAY FORK.—A. F. Wicke and O. Evans, Alliance, Ohio.

We claim the rod, A, foot, B, connecting rod, C, and lever, D, provided with the shoulder, C', when these several parts are constructed and operated as and for the purpose set forth.

63,346.—HEEL SHAVING GUARD.—J. E. Wiggin, and Daniel E. Crosby, Stoneham, Mass.

First. We claim the combination and arrangement of the guard, A, and pin, B, when the two are constructed substantially in the manner described.

Second, We claim the device of the ball and the socket joint when combined with the guard and center of a heel trimming machine.

63,347.—AXLE TREE.—James W. Wilkie, Auburn, N. Y.

First, I claim constructing the axle without a collar, and providing it on the underside of the arm, with an oil chamber, as and for the purpose set forth.

Second, The combination of the axle and box, when both are constructed as and for the purpose described.

63,348.—AXLE TREE.—James W. Wilkie, Auburn, N. Y.

First, I claim the employment of a divided nut as and for the purpose set forth.

Second, The employment of a divided nut in combination with the arm of the axle as constructed, as and for the purpose described.

Third, The box as constructed in combination with a divided nut, substantially as set forth.

63,349.—STEAM PLOW.—George Willard, New York City.

First, I claim in combination in a steam or other plow, as described, of the bars which carry the spades and other mechanism for breaking the ground, with the crank shafts for operating the same, under the arrangement herein specified, so that the said bars, while alternately and successively moved forwards and away from the earth, shall at all times maintain their parallelism with the surface passed over by the machine.

Second, The combination in the movable and adjustable plow frame of the coulters, with the vibrating spades and harrow teeth, under the arrangement and for operation as set forth.

Third, The combination with the stationary plow frame, of the movable frame and the cams, and their operative mechanism for adjusting the same frame to different elevations above the ground, the whole being arranged and operating as herein shown and specified.

Fourth, The herein described mechanism for adjusting the movable plow frame, the same consisting of a series of cams arranged and connected with the stationary and movable frame, on each side of the plow as described, and operated by means of a shaft mounted in the stationary frame and provided with a ratchet and pawl so that the movable frame may be elevated and lowered, or held at any desired distance from the ground, substantially as shown and set forth.

Fifth, The method of and means herein described for directing the movement of a steam plow or other like machine, that is to say, mounting the wheels of said machine upon their axles or shafts in such manner that each wheel and its respective axle may revolve together or independently of each other, substantially as and for the purposes set forth.

63,350.—METHOD OF SECURING CUTTER TO SICKLE BAR.—C. S. Williamson, Covert, N. Y.

I claim the cutter bar, having shoulders, resting against the sickle bar, A, with tapering shank, c, fitting in groove, a, of the sickle bar forming a dovetail joint, in the manner described, and for the purpose specified.

63,351.—VALVE FOR STEAM ENGINE.—James A. Woodbury, Boston, Mass.

I claim the valve constructed as described, and arranged with reference to the openings in the walled ports upon which it works, substantially as described, which arrangement enables me to regulate the movement of the inductive valves, so as to cut off the steam at any desired part of the stroke of the piston, without reference to exhaust valves.

63,352.—VALVE FOR STEAM ENGINE.—James A. Woodbury, Boston, Mass.

I claim the combination of two or more valves, with intermediate walls, when constructed and operating substantially as and for the purpose set forth.

63,353.—LOOM.—Caspar Zwicki, Chicago, Ill., assignor to James J. Walworth, and Gustavus E. Baschick.

I claim combining with the shuttle race, and with the cranks and connecting rods which actuate it, the links, D', when upheld by spring braces capable of vertical adjustment, and which, acting by their elasticity, ease the movements of the shuttle race substantially as described.

Also, in combination with the shuttle race, the springs, H, at either end, arranged over the top of the shuttle path, and provided with means for vertical adjustment, substantially as described.

And in combination with the picker staff of a loom, the cam, N, when provided with the adjustable piece, o, substantially as described.

RE-ISSUES.

2,524.—COMPOSITION FOR ROOFING.—John P. Cowing, Seneca Falls, N. Y. Patented Feb. 19, 1867.

I claim the simple compound of ground fire clay rock, or slaty clay and coal tar, as specified.

2,525.—PEN AND PENCIL CASE.—Lawrence A. Healy, New York City, by mesne assignments of Frederick W. Cox. Patented June 27, 1865.

I claim, First, extending the longitudinally moving tube, e, with the revolver, b, to such a length into the case, A, that the traveler can be made to move back, below or within the outer end of the tube, e, as set forth, whereby a pencil case is obtained, the tip of which can be moved in and out, and which is capable of carrying long leads.

Second, The circular groove, s, in the revolver, b, in combination with the pin, j, substantially as herein set forth, so that sufficient hold for the said pin is obtained without the necessity of a cap over the tube, e, and at the same time the revolver is prevented from moving in a longitudinal direction.

Third, The collar, o, in combination with the tube, f, and shell b, substantially as and for the purpose specified.

Fourth, The reserve lead chamber, p, extending partially or wholly round the revolver, b, when the same is made with or without a longitudinal motion, when said chamber is situated within the shell, A, substantially as and for the purpose shown and described.

2,526.—WARP-DRESSING FRAME.—Alexander M. Damon, Lowell, Mass. Patented October 9, 1866.

I claim the combination or mechanism for operating one or more raddles in manner as set forth, such consisting of the slotted bar, F, the gear, G, the pins, g p, and mechanism for revolving the said gear, the said bar, F being constructed and the whole being arranged together, and with the raddle or raddles, substantially as and so as to operate as hereinbefore explained.

2,527.—MACHINE FOR CUTTING AND FINISHING SHOE HEELS.—The McKay Heeling Machine Company, Boston, Mass., assignees by mesne assignments of William F. Edson. Patented Sept. 6, 1859.

I claim, in combination with a cutting, grinding, or polishing device for operating to shape or finish a boot or shoe heel, and where a movement is given to such device or to the heel, relative one to the other, a former or pattern located on the tread of the heel, and operating in connection with a shield against which it abuts, to govern in whole or in part the form of the heel.

Also, in a heel shaping or finishing mechanism, such an arrangement of a shield with reference to the cutting abraiding or polishing device, and to the counter of a boot or shoe having a heel to be cut, ground or polished, as will, by the abuttal of the said counter against said shield, govern in whole or in part the form of the heel.

Also, the combination with a heel shaping or with a heel finishing mechanism of a flexible counter protecting band arranged to operate substantially as described.

2,528.—SPELLING BLOCK.—Samuel L. Hill, Williamsburg, N. Y., assignor to himself, Albert Palmer and A. Sidney Doane. Patented Oct. 12, 1858.

First, I claim placing different letters of the alphabet upon two or more sides of cubical or six-sided blocks, so that by combining the same, words in which the same letters occur more than once may be readily spelled.

Second, I claim placing upon each block its proper numeral for the purpose specified.

2,529.—ENVELOPE MACHINE.—George H. Reay, and Lewis Negbaur, New York City, assignees by mesne assignments of George H. Reay. Patented Aug. 25, 1863.

First, We claim the employment of a movable carrier, E, in combination with the rising and falling lifters, F, constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The arrangement of the table, C, over the conveyor, H, substantially in the manner herein described, so that the blanks are held even and in place by the table, while being carried by the conveyor to the creasing box.

Third, The slotted lifters, F, in combination with the bar, c², in the table, C, as and for the purpose herein specified.

Fourth, The arms, e²², attached to the table, C, or to any other rigid part of the machine, and operating in combination with the conveyor, H, substantially as and for the purpose set forth.

Fifth, Feeding the blanks under the table or platform, which supports the gum box, instead of over it.

Sixth, The weight, c2, in the front edge of the table, in combination with the conveyor, H, applied and operating substantially as and for the purpose set forth.

Seventh, The balance weight, h9², in combination with the conveyor, H, applied and operating in the manner and for the purpose herein specified.

Eighth, Arranging the fingers, K, in such relation to the plunger, J, that they hold the flaps of the envelope, which have been creased by being passed through the box, I, until the plunger descends again and completes the envelope, by pressing it as set forth.

Ninth, The arrangement of hinge joints, k3, in the shanks of the folding fingers, K, in the manner and for the purpose substantially as described.

Tenth, The cam, m, and roller, m², or its equivalent, in combination with the plunger, J, constructed and operating substantially as and for the purpose specified.

Eleventh, Passing the plunger, J, below the lower creasing edge, l², of the box, in the manner specified, so as to push the finished envelope clear of the box, and leaving the creased envelope below the lower edge of the box, to prevent the same from going back with the plunger.

Twelfth, The ribs or ledges, j4, on the face of the plunger, as and for the purpose described.

2,530.—STEAM PUMP.—Louis C. Rodier and J. R. Gardiner, Springfield, Mass., assignees of Louis C. Rodier. Patented Aug. 14, 1866.

We claim, First, The arrangement of secondary valves, d d', ports, f f, and reservoirs, L L, at or near each end of the cylinder, operating with the piston, B, and valve, D, to reverse the motion of the piston, in the manner set forth.

Second, The arrangement of the water valves of the pump, consisting of hinge valves hung singly or in pairs upon pins constructed as described.

Third, Constructing the ping through which the water is forced when both valves are attached to it in the manner shown, having a longitudinal and a lateral partition, arranged substantially as set forth.

2,531.—MACHINE FOR ATTACHING AND FINISHING BOOT HEELS.—The McKay Heeling Machine Company, Boston, Mass., assignees by mesne assignments of Herman Saloshinsky. Dated Jan. 31, 1860.

I claim a machine organized so as to operate to drive or force several nails or pegs simultaneously from the inside of a boot or shoe through its sole into the heel thereof, substantially as described.

Also the combination in one machine of means for nailing or pegging the heel of a boot or a shoe to the sole thereof, and means for forming the curvilinear outline of the heel by causing a relative turning movement between the heel and a cutting edge, substantially as described.

2,532.—BRICK MACHINE.—Porter L. Sword, Adrian, Mich., assignee by mesne assignments of himself and George S. Tiffany. Patented June 14, 1864.

First, I claim adjustably suspending the mold wheel, C, from the bed plate upon wheels, E, upon which it revolves, substantially as set forth.

Second, The combination of the mold wheel, C, and pug mill, A, with a bed plate, C, having a curved lineal opening under the pug mill and over the molds, substantially as described.

Third, A curved tubular extension, D', leading from the bottom of the pug mill over the rim of the mold wheel through which the clay is fed to the molds, substantially as set forth.

Fourth, The inclined adjustable press plate, E, placed in the tubular extension, D', in combination with the mold wheel, C.

Fifth, The combination of the press plate, E, mold wheel, C, followers, F, and wheel, G, substantially as and for the purpose set forth.

Sixth, Adjustably suspending the wheel, G, from the bed plate, D, by rods, G3, substantially as and for the purpose set forth.

Seventh, The combination of the mold wheel, C, bed plate, D, and the adjustable packing rings, I and I', attached thereto, substantially as set forth.

Eighth, The combination of the adjustable press plates and adjustable knife, K, having a horizontal blade, substantially as set forth.

2,533.—BRICK MACHINE.—John Watson, Buffalo, N. Y., assignee by mesne assignments of himself. Patented June 5, 1866.

I claim the combination of an internal or grooved cam, as described, with a connecting rod or the equivalent thereof, operating the sliding mold of a brick machine, for the purpose of giving to the said mold the necessary reciprocating motions.

I also claim the combination of the pin, G, with the cam, E, to operate the above-mentioned reciprocating motion of mold, B, as and for the purposes described.

2,534.—ROLLER TEMPLE FOR LOOMS.—Henry Kayser, New York City, assignee of J. Mathia. Patented April 24, 1866. Antedated March 14, 1861.

I claim, First, A temple provided with a series of wheels set in an oblique direction, substantially as and for the purpose described.

Second, Giving to each of the oblique wheels an independent revolving motion, substantially as and for the purpose set forth.

Third, The eccentric shoulders, e, on the disk, d, which separate the oblique wheels, a, substantially as and for the purpose described.

DESIGNS.

2,606.—PARLOR STOVE.—C. Harris and P. W. Zoiner, Cincinnati, Ohio.

2,607.—PRINTERS' TYPE.—Andrew Little, New York City.

NOTE.—In the above list of patents we recognize the names of [illegible] some whose applications were solicited through the Scientific American Patent Agency

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CHAP. II. The Boiler—Marine boilers, distinguished from land boilers, gear connected with boilers, the tubular boiler, the number of boilers in each steam vessel, the steam chest, the fire bridge, ash pits, gunboat boilers, feed or donkey engine, boiler hand pumps, the safety valve, etc., etc.

CHAP. III. The Engine—Definition of steam engine, discoveries of Watt, single-acting engine, double-acting engine, high pressure or non-condensing engine, marine steam engine, side lever marine engine, paddle wheels, feathering paddles, reeling the paddles, disconnecting the wheels, methods of disconnecting paddle wheels, immersion of paddle wheels, paddle wheel brakes, the screw propeller, definition—length of screw; definition—angle of screw, pitch of screw, slip of screw, area of screw, thread of screw, diameter of screw, disconnecting the screw, methods of raising the screw, governors in screw ships, etc., etc.

CHAP. IV. Direct action engines, gorgon engines, Fairbairn's engines, Maudslay's double-cylinder engines, Boulton and Watt's direct engines, Messrs. Miller and Ravenhill's direct engines, oscillating engines, engines for working the screw propeller, direct acting screw engines, direct acting geared engines, oscillating horizontal engines, trunk engines, double acting air-pump, Maudslay and Field's return connecting rod engine, Humphrey's engine.

CHAP. V. Getting up the steam—Fully described.

CHAP. VI. Duties to machinery when under steam—Particular directions.

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Said inventions will embrace Boilers of Steam-engines, Anti-incrustators, Safety-valves, Steam-gauges, Water-gauges, Steering Apparatus, Life-boats, with detaching apparatus, &c., &c., &c.

Inventors may appear in person before the Commission, for the purpose of explaining their inventions; but no expenses will be allowed under any circumstances.

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WASHINGTON, D. C., March 15, 1867. 13 3*

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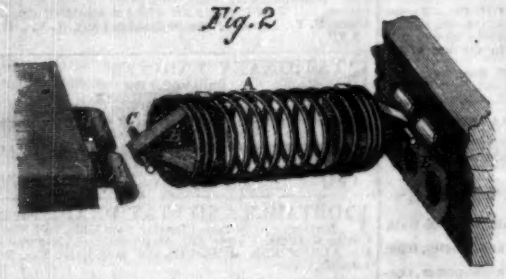
Fig. 1

CROSS' SPRING BED BOTTOM.

Fig. 2



This arrangement is the subject of a patent issued through the Scientific American Office, January 8, 1867. For further information address E. S. Cross, of Lime Rock, Conn., who will furnish information relative to the sale of rights, etc.

The Alexandra Palace.

This is the name of a magnificent structure now being erected by a limited company, on Muswell-hill, near London, for monster concerts, exhibitions, and other entertainments on the large scale. It consists of a nave 900x85 feet, crossed by three transepts, a central one 480x85 feet, and two near the ends, each 320x85 feet. A great dome rises over the intersection of the nave and central transept, 170 feet in diameter and 220 feet high. Externally, the whole outline of the nave and transepts is covered by a brick structure fifty feet deep, in a handsome Italian style, in two colors of brick, white ground and red arches, with facings of Portland stone. The grand orchestra, nearly under the dome, will accommodate 3,000 performers, and the auditorium space adjoining will accommodate 20,000 persons without crowding. There will also be smaller concert rooms and a theater within the building. A large variety of refreshment and dining rooms are also provided.

Handsome terraces, shaded with trees and adorned with turf and flowers, walks and arbors, surround the palace, and one of them, 1,000x160 feet, covers a railway station into which all the London railways will run their trains. The palace will not be opened until next year.

BADGER'S IMPROVED NUTMEG GRATER.

The little implement shown in the engraving will commend itself for simplicity and efficiency to the cook and housekeeper. It is a quadrant of tin secured to a little platform of wood, the face of the segment being perforated to form a grater. Inside is a tube large enough in diameter to receive a nutmeg. It is a double tube, the outside case being half as long as the inside, and pivoted at the top to the angle of the quadrant so as to swing its other end around the segment. This outer tube is open at both ends and receives a longer one the bottom of which is roughened by perforations. The nutmeg is dropped into the bottomless outer case thus coming in contact with the segmental grater, when the inner tube is inserted, the roughened bottom of which holds it firmly while

the hand swings the tube back and forth, at the same time pressing the inner tube down. The method of holding and operating is seen by the position of the hands in the engraving. One advantage of this grater is that the nutmeg can be powdered so long as any of its substance remains; and another that there can be no abrasion of the fingers in the operation of grating. The tube is long enough to receive a number of nutmegs at once.

This device was patented through the Scientific American Patent Agency, January 8, 1867, by L. V. Badger, whom address, Drawer 6140, Chicago, Ill. [See advertisement on another page.]

THE CHEMICAL FORCE OF THE SOLAR LIGHT (actinism), upon which organic nature depends so largely for life and health, varies very much under different conditions: so much so that within the tropics it is said to be very difficult to obtain good photograms. The apparatus for determining it relatively has lately been improved by Bunsen and Roscoe, in a manner analogous to that for measuring ozone. After many experiments they have succeeded in preparing paper of a standard sensitiveness, in which the tint produced in a given number of seconds varies in exact proportion to the intensity of chemical force in the light employed. It was found in that climate (France) that the actinic intensity varied from 1 to 20 between December and June. The vitality of plants and animals is very much assisted or retarded by this variation. Physiologists are begining to set a high value upon light as a preservative and restorative of health.

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